ARTEP 44-635-14-DRILL

PATRIOT CREW DRILLS FOR THE PAC-2/PAC-3 LAUNCHING STATION AND MISSILE RELOAD

OCTOBER 2003

HEADQUARTERS, DEPARTMENT OF THE ARMY

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PATRIOT Crew Drills For The PAC-2/PAC-3 Launching Station and Missile Reload

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PREFACE

1. Standardized drills are an essential element to the success of the Patriot launching station and missile reload on the battlefield. These drills provide performance measures and a collective sequential set of procedures that, when applied Armywide, will minimize the impact caused by the turnover in personnel. These drills are for use by the trainers at battery and platoon level to train their crews to do the selected collective tasks correctly and rapidly. Drill training is an inseparable part of peacetime combat-oriented training, which improves proficiency in mission-oriented individual and collective tasks, maintains high combat readiness, and promotes cohesive teamwork and esprit de corps.

2. This drill publication is one of a set of books that includes ARTEPs 44-635-11-Drill, 44-635-12-Drill, 44-635-13-Drill, and 44-635-15-Drill, all of which contain Patriot standardized drill procedures.

3. This drill publication addresses crew drills for emplacement, march order, and missile reload for the Patriot LS. This drill book is separated into chapters and appendixes with applicable information to assist the platoon sergeant or squad leader in training his crew.

4. The target audience for this drill includes leaders, trainers, and evaluators of Patriot battalions organized under TOE 44-635.

5. Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

6. The proponent for this publication is HQ, TRADOC. Submit recommended changes to improve this publication on DA Form 2028 to: Commandant, United States Army Air Defense Artillery School, ATTN: ATSA-DT-WF, Fort Bliss, Texas 79916-3802.

CHAPTER 1

UNIT TRAINING

1-1. General. The goal of training is to produce combat-ready units that respond rapidly to known or suspected enemy activity and defeat the enemy. Drill training is a key factor in achieving that goal. It describes a training method for small units. This method requires training individual tasks, leader tasks, and collective tasks before the conduct of critical wartime missions. Leaders should tailor training to realistic, challenging, and attainable goals, while increasing the difficulty of conditions as the unit becomes more proficient.

a. A crew drill is a collective action that a crew of a weapon or piece of equipment must perform to use the weapon or equipment successfully in combat or to preserve life. This action is a trained response to a given stimulus such as a simple leader's order or the status of the weapon or equipment. It requires minimal leader orders to accomplish and is standard throughout the Army.

b. These drills have many advantages:

(1) They are based on unit missions and the specific tasks, standards, and performance measures required to support mission proficiency.

(2) They build from simple to complex and focus on the basics.

(3) They link how-to-train and how-to-fight at small unit levels.

(4) They provide an agenda for continuous coaching and critiquing.

(5) They develop leaders and build teamwork and cohesion under stress.

(6) They enhance the chance for individual and unit survival on the battlefield.

1-2. Training guidance. Crew drills are trained using a talk-through, walk-through, and run-through method. You, of course, must be a master of the drill to train your soldiers to execute it. You may wish to periodically talk your soldiers through the drill—explaining each soldier’s role. Then have them go through it slowly, on open ground, correcting any mistakes as they go. Whenever possible, train in a new environment in which you would expect to execute the drill in wartime. Train frequently in MOPP and be tough on yourself and your soldiers. Good teams execute instantly and with precision. Your team will pay a high price for failure if they do not.

1-3. Safety considerations. During the conduct of a drill, all soldiers and leaders must be safety conscious. All O/Cs and trainers have the responsibility to ensure that all training is conducted in a safe manner. Prior to the beginning of a drill, all personnel must be briefed on specific safety measures to be observed during the conduct of the exercise.

1-4. Evaluation information. The purpose of evaluating a drill is to determine if the unit can perform all of the performance measures within the allowed standards. During evaluation, concentrate on the unit’s performance, not that of specific individuals. The best location for an O/C is one

in which he can observe the actions of the entire unit. Use the drill book as a checklist. We recommend you do not use local checklists, as they can become negative training tools.

CHAPTER 2

CREW DRILLS

2-1. General. A crew drill is a collective action that a crew for a weapon or a piece of equipment must perform to use the weapon or equipment successfully in combat or to preserve life. The crew drill task is initiated on a cue and performed to specified standards.

2-2. CREW DRILL 44-5-D013.

TASK: Emplace the (PAC-2) LS for Tactical Operations (44-5-D013).

CONDITIONS: The battery is preparing to occupy a new position. The LS is in the march order configuration, and a general location to emplace the LS has been selected. All components of the LS are available and operable. A crew has been assigned to emplace and prepare the system for tactical operations in all environmental and NBC conditions, both day and night. As the LS crew approaches the selected position, the LS ground guide orients and positions the LS to a designated spot and commands, “Halt vehicle.”

STANDARDS: Emplace and prepare the LS for tactical operations by the performance measures as sequenced in this drill. Complete this drill within 25 minutes when in a training or evaluation environment.

Notes:

- Allow additional emplacement time when fiber-optic cables are to be installed.
- The time required to perform this drill in MOPP 4 will increase per ARTEP 44-637-30-MTP.

SUPPORTING INDIVIDUAL TASKS: Supporting individual tasks for this drill are listed in Appendix A, Individual Task-to-Drill Matrix.

ILLUSTRATIONS: Figure 2-1.

SETUP INSTRUCTIONS: The following equipment, areas, and personnel must be provided for the drill to be trained correctly.

a. Resources. As a minimum, the following is required: One LS, GM, semitrailer-mounted, with basic issue items.

b. Training site. The potential site must be large enough (10x20 meters) to prevent fires from hot exhaust. The site should be as level as possible. The maximum allowable slope from front to back or side to side is 10 degrees.

c. Unit instructions. The crew members will emplace and prepare the LS for tactical operations at a designated location using the following procedures:

(1) Before the launcher platoon arrives, the RSOP team will have decided the position of each LS and emplaced marker stakes and ground rods to show launcher vehicle positions.

(2) All launcher vehicles should arrive on site at approximately the same time and stop a short distance from the launcher emplacement sites.

(3) One crew member from each vehicle will serve as a ground guide to direct the driver to position the LS at the selected emplacement site.

TALK-THROUGH INSTRUCTIONS: The mission of the LS is to transport, store, support, aim, and fire missiles during normal air defense missions. The crew members must be able to emplace the LS and prepare it for tactical operations where directed within prescribed time limits.

a. Orientation. Before beginning drill training, ensure that each crew member knows the purpose of the drill and is briefed on safety awareness.

b. Safety/Fratricide. All soldiers that operate the LS must know that safety hazards exist while operating the various items of equipment. These hazards can and have caused severe injuries to operators. Be extremely careful when working around the LS. Throughout the crew drill, observe all dangers, warnings, and cautions required to properly emplace the LS. All commanders, trainers, and leaders must plan, train, and stress all procedures, which must be followed to avoid fratricide. These procedures include IFF, weapon control status, vehicle and aircraft recognition, corridors, routes, zones, flight levels, and other control measures. Munitions cannot distinguish between friend or foe.

c. Demonstration (optional). If a nearby crew has successfully performed the drill, have that crew demonstrate the drill. Explain what is being done and why, using the performance measures as a guide. After the demonstration, summarize.

d. Explanation. Explain the drill in the following manner:

(1) Using a diagram, Figure 2-1, a sand table, or a simple sketch in the dirt, show the crew members how the LS should be emplaced.

(2) Tell the crew members what their duties are in the drill.

(3) Read the performance measures of the drill to the crew members.

(4) Have crew members explain their performance measures to ensure that they understand them.

WALK-THROUGH INSTRUCTIONS:

a. Have crew members take their positions and perform the drill. Use the crawl-walk-run method of training. Start the training slowly. Correct any mistakes the crew members make as they go; do not proceed until drill procedures are performed correctly. After the crew members demonstrate their proficiency at a slow pace, let them do it faster. Remember, however, that safety is never sacrificed for speed. Watch carefully to make sure the crew members achieve all of the standards for the drill.

b. Initiating Cue. The LS ground guide orients and positions the LS to a designated spot and commands, “Halt vehicle.”

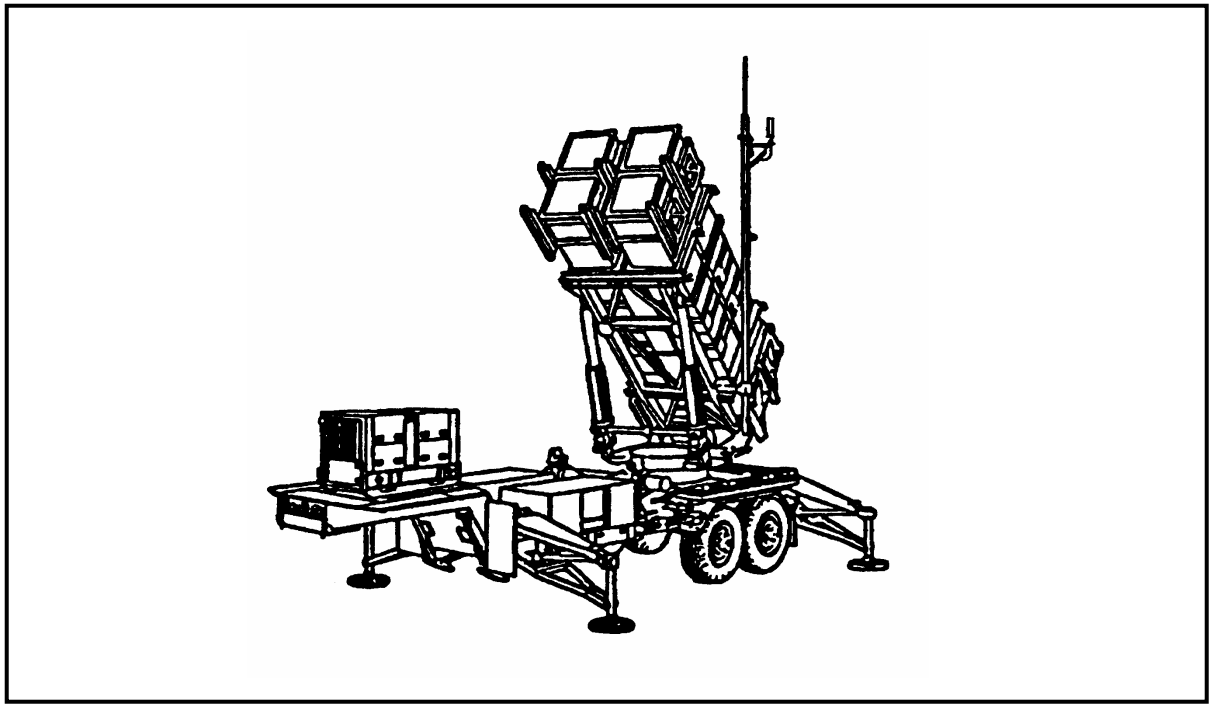


Figure 2-1. LS Emplacement.

PERFORMANCE MEASURES: The crew members listed below complete their performance measures as they are stated in the sequence shown. They must synchronize the completion of like-numbered performance measures.

Note: If emplacing the LS using automatic emplacement procedures, LS GPS cold start, crypto key code loading, and accuracy verification should be performed prior to field exercises. Refer to Appendix B.

WARNING
Turn off outrigger power each time crew member leaves outrigger control panel during outrigger deployment.

WARNING
If a GM is dropped a foot or more, it may present a hazard. Notify battery commander and await instructions.

CREW MEMBER 1	CREW MEMBER 2
1. Maneuvers LS tractor and trailer to designated position and orients as directed. Note: For evaluation purpose time starts here. a. Halts vehicle and pulls out the tractor PARKING BRAKE control knob. b. Pulls out TRAILER AIR SUPPLY control knob. Verifies trailer brake control is off. Note: If FOCA is to be emplaced, refer to Appendix D for emplacement procedures.	1. Orients and positions the LS tractor and trailer to its designated spot and commands, “Halt vehicle.”

CREW MEMBER 1	CREW MEMBER 2

DANGER

Do <u>not</u> stand directly in front of or in back of the vehicle until wheels are chocked. Failure to do so may cause permanent injury or death.

2. When notified by CM 2 that tractor wheels have been chocked, exits vehicle.

Note: Perform step 3 if ground rod is not emplaced. Perform step 3e if ground rod is emplaced.

3. Gets three ground rod sections, three couplings, a driving stud ground clamp, sledgehammer (or driver assembly), and grounding cable from the roadside storage box.

a. Connects a coupling to the ground rod and installs a driving stud. Ensures that the driving stud seats on the ground rod.

2. Obtains chocks from storage compartment.

a. Chocks tractor .

b. Notifies CM 1 that tractor wheels are chocked.

Note: Uphill—place chocks behind tractor rear wheels curbside and roadside. Downhill—place chocks in front of tractor wheels curbside and roadside.

3. Deploys fire extinguishers.

a. Removes curbside and roadside travel lock pins.

Note: Place one chock at rear of roadside rear wheel and the other chock in front of curbside rear wheel.

Note: Uphill—place chocks behind semitrailer rear wheels curbside and roadside. Downhill—place chocks in front of semitrailer wheels curbside and roadside.

CREW MEMBER 1	CREW MEMBER 2
b. Places ground rod no more than 15 feet from LS ground connector.	b. Deploys trailer chocks and assists CM 1 with ground rod.
c. With sledgehammer (or driver assembly), drives the ground rod section into the ground until the coupling is just above the surface. Removes the driving stud.	
d. Repeats the procedure using another coupling and ground rod section. Drives the ground rod to a minimum depth of 8 feet to provide an effective ground. Removes the driving stud and top coupling. Stows stud, coupling, and sledgehammer (or driver assembly).	
e. Tightens ground clamp and one end of grounding cable to the ground rod.	
f. Connects the other end of ground cable to semitrailer push-on connector.	

CAUTION
Ensure outrigger safety chains are disconnected before lowering outriggers.

4. Assists as needed.	4. Deploys outriggers.
a. Unhooks outrigger safety chains	a. Unhooks outrigger safety chains.

WARNING
Keep fingers outside outrigger control box cover until it is locked open. Cover snaps open and can injure fingers.

CREW MEMBER 1	CREW MEMBER 2
	b. At outrigger control box, opens and secures cover.
c. Notifies CM 2 that outrigger safety chains are disconnected	c. Lifts red safety guard for POWER safety ON/OFF switch and sets to ON.
	d. Ensures leveling device lamp is on (red). Power is supplied to switches.

Note: At night, crew members must be careful to coordinate their work and signals while lowering outriggers and uncoupling tractor from semitrailer. Use lights to signal for all operations that require signals. Use lights to ensure area is clear before starting. Make all movements slow and deliberate. Do not rush. One crew member operates outrigger controls; another crew member observes outriggers and semitrailer. Observer
should signal operator when area is clear and keep operator informed of outrigger and semitrailer condition.

WARNING

Ensure that personnel are clear of outrigger movement and clear of LS before using outrigger controls.

CAUTION

Do not lift front of trailer high enough to put pressure on tractor fifth wheel

5. Clears personnel from around outriggers and semitrailer area.	5. Checks with CM 1 to ensure area is clear of personnel.
a. Proceeds to rear LS trailer to aid CM 2 in outrigger deployment.	a. In tandem, holds down the two rear outrigger control switches (on left, facing box).
b. Verifies rear outriggers have firm contact with the ground.	
c. Notifies CM 2 when rear outriggers contact the ground.	c. Releases control switches when signaled that the rear outriggers have touched the ground.

CREW MEMBER 1	CREW MEMBER 2
	Note: For uneven terrain, ensure outrigger arms will lower below the trailer height and that the trailer will level. If not, relocate LS to terrain level enough to meet leveling requirements.
6. Goes to front roadside outrigger, coordinates with CM 2, and signals when front outriggers support the front of trailer.	6. In tandem, holds down the two front outrigger control switches (on right, facing box).
a. Ensures outriggers have firm contact with the ground.	a . Releases switches when outriggers firmly touch ground and trailer weight is off kingpin plate. Does not lift trailer off tractor fifth wheel.
b. Signals CM 2 to lower front outriggers until the trailer breaks contact with the fifth wheel and daylight can be seen.	b. Continues to operate outrigger control box receiving signals from CM 1.
	c. Turns off power at the outrigger control panel.
7. Uncouples tractor from trailer.	7. Clears personnel from around trailer and tractor coupling.
a. Removes and stows trailer air brake lines and intervehicular cable.	a. Assists as needed.

WARNING

Verify that tractor wheels are chocked before proceeding with next step.

DANGER

Do not stand between tandem wheels of tractor when coupling or uncoupling trailer. Trailer must be resting on both front outrigger pads, and wheels should be firmly chocked. Failure to do so may cause permanent injury or death.

CREW MEMBER 1	CREW MEMBER 2
b. At tractor fifth wheel, pulls out secondary lock release handle and hooks in out position. Pulls out primary lock release handle and hooks in out position	
c. Climbs into cab of tractor. When all personnel are clear of area, pushes in PARKING BRAKE control knob and moves tractor forward, when signaled by CM 2.	c. When personnel are clear of area, removes chocks from tractor wheels. Signals CM 1 forward until tractor fifth wheel clears trailer gooseneck. Signals CM 1 to stop.
d. Sets transmission to NEUTRAL and pulls out PARKING BRAKE control knob. Leaves the engine running.	d. Replaces one chock in front of curbside rear tandem wheel and the other chock at rear of roadside rear tandem wheel.

DANGER
Do not leave tractor unattended before chocking wheels. Tractor may roll, resulting injury or death

e. When notified by CM 2 that chocks are emplaced, exists cab.	e. Notifies CM 1 that tractor wheels are chocked. Note: Trailer must be leveled as close to center ring as possible but not outside fifth ring, as shown by level indicator at bottom of outrigger control box cover. At least one trailer wheel on each side must be off the ground.

CAUTION
Do not use outrigger control switches in diagonal pairs.

CREW MEMBER 1	CREW MEMBER 2
8. Assists CM 2 with leveling of the LS. Notifies CM 2 that the LS is clear of personnel.	8. When notified by CM 1 that launcher is clear, turns on power at outrigger control panel. Table 2-1 shows how to control outriggers.
a. Positions himself at trailer roadside and observes outriggers. Signals CM 2 to raise gooseneck off fifth wheel.	a. When signaled by CM 1, operates front outrigger switches until gooseneck is off fifth wheel.
b. Signals CM 2 to raise rear outriggers until trailer wheels are off the ground and then notifies CM 2 to level trailer.	b. When signaled by CM 1, raises rear outriggers until trailer tires are clear of the ground.
	c. Uses outrigger control switches in conjunction with level indicator on inside of cover.
	Note: Use a single outrigger control switch, if one outrigger has to be moved more than another.

Table 2-1. Control Outriggers.

SWITCHES	OUTRIGGERS
Right top and bottom	**Two front**
Left top and bottom	**Two rear**
Top two	**Two roadside outriggers**
Bottom two	**Two curbside outriggers**

DANGER

Ensure <u>all</u> four outriggers have firm contact with the ground. Otherwise, death or serious injury will result.

CREW MEMBER 1	CREW MEMBER 2
	d. When signaled by CM 1, sets POWER ON/OFF switch at outrigger control box to OFF. Closes red safety guard. Closes and secures cover.
e. Ensures roadside outrigger pads have firm contact with the ground.	e. Ensures curbside outrigger pads have firm contact with the ground.
f. Removes roadside chock block from rear axle wheel of semitrailer and stows.	f. Removes curbside chock block from rear axle wheel of semitrailer and stows.

CAUTION

Equipment damage can result if both travel lock pins are not completely removed and stowed.

9. Drains semitrailer air tank by pulling T-handle at rear of semitrailer and assisting as needed.	9. Prepares launcher platform by extending fender and side work platforms into work positions.

Note: If launching station is not equipped with a tactical quiet generator set (MEP 814A), CM 1 will perform step 10. If launching station is equipped with a tactical quiet generator set (MEP 814A), CM 1 will perform step 11.

DANGER

Do not start the generator set until the LS is connected to a suitable ground. Serious injury or death by electrocution can result from operating ungrounded LS.

CAUTION

The generator set may be damaged if the slave receptacle is used for any purpose other than slave starting.

CREW MEMBER 1	CREW MEMBER 2

WARNING
Generator load banks are <u>not</u> to be installed nor used with the Patriot launcher generator set.

10. Starts generator set.

a. Performs before-operation checks and services described in TM 9-6115-464-12.

10. Prepares DLTM and LEM for operation.

a. Removes water from DLTM (A2) door channels with cloth or sponge, if necessary. Ensures that the following switches are in the proper position.

(1) All DLTM PDU circuit breakers and switches are off.

(2) LEM MAIN POWER-CB1 to OFF.

(3) LEM RAISE-STOP-LWR to STOP.

(4) LEM LOCAL-RMT to LOCAL.

(5) LEM BITE TEST-OFF-STATUS LAMP TEST to OFF.

(6) LEM PANEL LAMPS switch to OFF.

(7) LEM LS NUMBER and LS BANK are in the correct address.

(8) All LEM PDU circuit breakers and switches are off.

(9) At DLTM processor A2A4, ensures the COMPUTER and MODE SELECT switches are set to 0 or 1, as required to view display, and verifies that SELECT switch is set to FRONT.

CREW MEMBER 1	CREW MEMBER 2

b. Opens and latches generator control cubicle and air vent doors.

c. Sets controls and verifies indicators as follows:

(1) DC CONTROL circuit breaker to CLOSED position (pushed in).

(2) START-RUN-STOP to RUN.

(3) BATTLE SHORT—lifts safety guard and sets to ON. (Fuel transfer pump will make clicking sound when transferring fuel into day tank.)

(4) FUEL LEVEL gauge indicates acceptable fuel level.

(5) At the upper right corner of the panel, verifies lights indicate as follows:

(a) UNDER VOLT is on.

(b) LOW OIL PRESS is on.

(c) UNDER FREQ is on.

(6) When day tank is full (about 2 minutes) and clicking sound stops, sets the BATTLE SHORT switch to OFF and closes the safety guard.

(7) Holds the TEST or RESET switch to TEST. Observes all fault indicators are ON. Releases switch.

CREW MEMBER 1	CREW MEMBER 2

CAUTION
Do not crank the engine over 15 seconds. Allow the starter to cool at least 3 minutes between cranking.

Note: If the outside temperature is 50 degrees Fahrenheit (10 degrees centigrade) or below, perform step d below. If the temperature is above 50 degrees Fahrenheit (10 degrees centigrade), perform step e below.

d. Starts the generator set under cold weather conditions (if temperature is 50 degrees Fahrenheit [10 degrees centigrade] or below). Assists with verifying torque values.

d. Verifies torque value of canister tie-down bolts (refer to Appendix I).

CAUTION
Do not inject either more than three times.

Note: If the engine fails to start after injecting ether three times, cease operation and notify engineer maintenance.

(1) Starts the generator set using the start aid. Holds START-RUN-STOP switch to START. At the same time, sets the ENGINE PRIMER switch to ON momentarily, and then releases the ENGINE PRIMER switch. (The ENGINE PRIMER switch injects ether into the air cleaner.)

(2) Continues to hold the START-RUN-STOP switch to START until the OIL PRESSURE gauge indicates 30 to 55 psi and the VOLTS AC meter indicates voltage, but holds for no longer than 15 seconds.

CREW MEMBER 1	CREW MEMBER 2

Note: If the engine fails to start within 15 seconds, release the START-RUN-STOP switch. Allow at least 3 minutes for the starter motor to cool before trying to start again.

(3) When the engine starts, sets the START-RUN-STOP switch to RUN.

Note: If time permits, let engine warm up for 3 minutes without load applied.

e. Starts the generator set normally (if temperature is 50 degrees Fahrenheit (10 degrees centigrade) or above.

(1) Holds the START-RUN-STOP switch to START until the OIL PRESSURE gauge indicates 30 to 55 psi and the VOLTS AC meter indicates voltage, but holds for no longer than 15 seconds.

Note: If the engine fails to start within 15 seconds, release the START-RUN-STOP switch. Allow starter to cool for 3 minutes and repeat step (1) above. If engine does not start after three tries, notify engineer maintenance.

(2) When the engine starts, sets the START-RUN-STOP switch to RUN.

f. Checks the voltage output for 120 vac for each line-to-neutral and 208 vac line-to-line on the VOLTS AC meter on the control panel. Adjusts the voltage, if necessary, using the VOLTAGE ADJUST control.

g. Checks the frequency for 400$\pm$2 Hz on the frequency meter. Adjusts the frequency, if necessary, using the FREQUENCY ADJUST control.

CREW MEMBER 1	CREW MEMBER 2

h. Rolls up and secures louver covers.

Note: During generator warm-up, CM 1 may assist CM 2 with fiber-optic cable emplacement and torquing the GMCs.

11. Starts generator set.

a. Performs before-operation checks and services per TM 9-6115-643-10.

b. Places DEAD CRANK switch to NORMAL position.

c. Places AM-VM transfer switch in a position corresponding to terminal load connections per TM 9-6115-645-10. Ensures PARALLEL UNIT switch is in UNIT position.

d. Places MASTER SWITCH to PRIME and RUN position.

e. At malfunction indicator panel, pushes PRESS-TO-TEST push button on and ensures all lights are lit; releases PRESS-TO-TEST push button and ensures all lights are off.

f. At control panel assembly, presses BATTLE SHORT light and ensures light is lit; releases PRESS-TO-TEST light and ensures light is off.

g. At control panel assembly, presses AC INTERRUPTER light and ensures light is lit; releases PRESS-TO-TEST light and ensures light is off.

CREW MEMBER 1	CREW MEMBER 2

CAUTION

Do not crank engine in excess of 15 seconds. Allow starter to cool at least 15 seconds between attempted starts. Failure to observe this caution can result in damage to the starter.

Note: At temperatures below 40 degrees Fahrenheit (4 degrees centigrade), it may be necessary to use the cold weather starting aid by turning MASTER SWITCH to PREHEAT for 30 seconds.

h. Rotates MASTER SWITCH to START position.

i. Holds MASTER SWITCH in START position until oil pressure reaches 25 psi (172 kPa), voltage has increased to its approximate rated value, and engine has reached stable operating speed.

Note: If operating with an auxiliary fuel source, rotate MASTER SWITCH to PRIME and RUN AUX fuel position.

j. Releases MASTER SWITCH to PRIME and RUN position.

Note: If time permits, let engine warm up for 5 minutes without load applied.

k. Turns VOLTAGE and FREQUENCY adjust potentiometers to required values for voltage and frequency.

l. Presses GROUND FAULT INRERRUPTER TEST push button and ensures window is clear, presses RESET push button and ensures indicator is red.

CREW MEMBER 1	CREW MEMBER 2
m. Checks COOLANT TEMP and OIL PRESSURE indicators for normal readings. (1) COOLANT TEMP reading should be 170 to 200 degrees Fahrenheit (77 to 93 degrees centigrade). (2) OIL PRESSURE reading should be 25 to 60 psi (172 to 414 kPa). n. Rolls up louver covers. Note: During generator warm up, CM 1 may assist CM 2 with fiber-optic cable emplacement and torquing the GMCs.	
12. Stands on LS and assists CM 2 with installing data link mast assembly.	12. Climbs up on roadside maintenance platform, releases two antenna storage tube catches, and with assistance from CM 1, removes data link antenna.

WARNING

Data link antenna may be hot. Wear protective gloves to keep from injuring hands.

CAUTION

Remove DLU antenna with extreme care to prevent damage

Note: At night crew members must be careful to coordinate their work and signals while mating the data link mast assembly.

CREW MEMBER 1	CREW MEMBER 2

CAUTION
Use extreme care when removing DLU antenna to prevent damage to GPS antenna.

WARNING
Observe actions of CM 2 during assembly of DLT antenna, and warn CM 2 of any unsafe conditions.

a. Takes antenna element from CM 2; slides antenna base into lower mast.

b. Disconnects ground cable from storage connector and connects to ground adapter.

c. Disconnects RF cable from dummy connector and connects RF cable to RF adapter.

d. Installs dust cover on dummy connectors.

WARNING
Observe actions of CM 1 on forward outrigger, and warn CM 1 of any unsafe conditions.

a. Passes antenna element to CM 1 for installation.

CAUTION
The generator must run 3 or 5 minutes (as applicable) for warm-up before circuit breaker is closed.

CREW MEMBER 1	CREW MEMBER 2
13. Checks and closes the generator circuit breaker as follows:	13. Verifies generator warm-up time has elapsed with CM 1.
a. At generator control panel, holds CKT BKR switch to CLOSE until CKT BKR lamp comes on, indicating main load contactor is closed.	
b. Verifies all generator fault lamps are off.	
c. Checks voltage and frequency (120 vac, 400 Hz).	
d. Checks temperature gauge (170 to 200 degrees Fahrenheit).	
e. Closes and secures the control cubicle access doors.	
f. On the PCP, forward end of the LEM, sets MAIN POWER-AC CB1 to ON.	
g. Notifies CM 2 to energize the DLTM.	g. When notified by CM 1, energizes the DLTM-PDU as follows:
	(1) Sets LAMPS switch to ON.
	(2) Sets BLOWER circuit breaker to ON.
	(3) Checks BLOWER OPR light is on.
	Note: Ensure the BLOWER OPR light is on before continuing.
	(4) Sets PWR SPLY circuit breaker to ON.
	(5) Verifies PS1 and PS2 lights are on.
	(6) Sets RADIO circuit breaker to ON.

CREW MEMBER 1	CREW MEMBER 2
	(7) Sets SBU circuit breaker to ON.
	(8) Sets DGTL PROCESSOR circuit breaker to ON.
	(9) Sets PROCESSOR FAULT IND circuit breaker to ON.
	(10) Sets MAPS circuit breaker to ON.
	(11) Sets LAMPS switch to OFF.
	h. At power supply A2A3, verifies MAPS circuit breaker is on (AEE).
i. At LEM, opens doors and verifies the LS Number and LS Bank switches are at the assigned positions.	i. At processor A2A4, verifies panel display indicates LS DLU-DP and BANK: _____:?, ADDRESS: _____:?.
j. Acknowledges notification from CM 2.	j. Notifies CM 1 that checks are complete.

WARNING
Open radio access door carefully to avoid injury to fingers or hands.

14. Energizes the LEM as follows:	14. Prepares to synchronize DLT. Performs DLT self-test.
a. Opens LEM doors.	a. Sets CB1 to OFF.
b. Removes water from LEM door channels with cloth or sponge, if necessary.	b. At radio AN/VRC-90A, disconnects W15P2 from AUD/DATA.
c. At the LEM-PDU A1A2, places the following switches, in the order listed, to the positions indicated:	c. At power amplifier, disconnects W13P1 from J1 ANT.

CREW MEMBER 1	CREW MEMBER 2

(1) Sets and holds the LAMPS switch to TEST.

(a) Observes that the BLOWER OPR and the two panel lamps are on.

(b) Releases the LAMP switch and sets to ON.

(2) At the LAUNCHER ELECTRONICS AC group, sets the following to ON:

(a) BLOWER.

Note: Ensure the BLOWER OPR light is on before continuing.

(b) MAIN A.

(c) MAIN B.

(d) LCHR ELEX 5 VDC PWR SPLY

(e) ORD PWR SPLY.

(f) LCHR ELEX 28 VDC PWR SPLY.

(3) At the LCU, POWER SUPPLIES group, verifies the following lamps are on:

(a) ± 5 VDC lamp.

(b) ± 15 VDC lamp.

(c) ± 28 VDC lamp

CREW MEMBER 1	CREW MEMBER 2

(4) At the LAUNCHER ELECTRONICS AC group, sets the following to ON:

(a) MSL 5 VDC PWR SPLY.

(b) MSL GYRO/CLOCK PWR SPLY.

(c) MOT CONT UNIT AC

WARNING

<u>Before</u> proper missile hazard light indications can be obtained on the LCU display panel, DLTM processor LCD display <u>must</u> indicate "LS DLU-DP."

WARNING

LCU display panel BITE test <u>must</u> also be run to assure proper indications. After BITE test, a missile hazard light on the LCU display panel indicates a hazardous condition for locations having a live missile with GM cable connected.

Note: A missile hazard light will on for each location having a dummy missile empty canister, empty location, or a live missile with GM cable disconnected. These conditions do not constitute a hazard.

d. At LCU display panel, verifies the following.

d. At A2A8 radio mounting adapter, ensures CB1 is set to ON and POWER indicator is on.

CREW MEMBER 1	CREW MEMBER 2

DANGER

If one of the missile hazard lights comes on and a live missile is present with GM cable connected at location (as indicated by a light), immediately notify ECS of the condition indicated and advise that the LS will remain in local mode. After notifying ECS, evacuate area and await further instructions. Ordnance devices may explode, resulting in injury or death.

(1) LOCAL-RMT switch is set to LOCAL; LOCAL lamp is on. The key is removed and in the control of the section or assistant section chief.

(2) ALL MISSILE HAZARD lights are off at all live GM positions.

(3) The four MISSILE DISCONNECTED lights are on. Verifies status lights are not flashing.

e. At the PDU LAUNCHER ELECTRONICS AC group, sets the following switches to ON:

(1) MSL PAFU/ITL PWR SPLY.

(2) MSL TWT FIL PWR SPLY.

(3) The CNVC OUT CANISTER HTR AC, if canister heater kit is installed and required

Note: If missile voltage is not applied, disregard step f and go to step g.

f. At LEM-PDU, sets the four MISSILE HEATER AC circuit breakers to ON, in the order listed:

(1) UPR L MSL.

e. At radio AN/VRC-90A, sets FCTN to SQ ON.

Note: If missile voltage is not applied, disregard step f and go to step g.

f. At A2A8 (mounting adapter), sets data rate to OFF.

CREW MEMBER 1	CREW MEMBER 2
(2) UPR R MSL.	
(3) LWR L MSL.	
(4) LWR R MSL.	
g. On PDU, sets LAMPS switch to OFF	g. At radio AN/VRC-90A, presses DATA/4 key. Observes OFF displays.

CAUTION

The LEM-PDU access door must remain closed after the PDU is energized to prevent degrading EMI shielding.

h. Closes PDU door.	h. If OFF does not display, presses CHG/7 key. Repeats until OFF displays.
	i. At radio AN/VRC0-90A, sets the following:
	(1) MODE to FH.
	(2) CHAN to 1.
	(3) COMSEC to CT.
	(4) RF PWR to M.
	(5) DIM fully clockwise.
	(6) VOL/WHSP pushed in and turned fully clockwise.
	(7) FCTN to TST. Observes GOOD displays.

CREW MEMBER 1	CREW MEMBER 2
	Note: If GOOD displays, radio has passed self-test. If above indicators were not observed or FAIL 1 displayed, set FCTN to STBY, then repeat step i (7). If radio fails self-test a second time, call organizational maintenance.
15. Performs local BITE test at LCU display panel.	15. Performs DLT AN/VRC-90A quick start or full load start procedures. Note: If radio has not been powered down for more that 24 hours and FCTN switch was not set to OFF or Z-FH, perform quick start procedures (step a below). If radio has been powered down for more than 24 hours, or FCTN switch was set to OFF or Z-FH, perform full load start procedures per Appendix B. If frequency hopset, COMSEC codes, or TOD SYNC time need to be loaded into radio AN/VRC-90A, then perform full load start procedures per Appendix B.
a. If panel lighting is required, sets PANEL LAMPS switch to ON.	a. Determines if frequency hopset is loaded in ICOM radio as follows: (1) Sets CHAN to appropriate position. (2) Verifies FCTN is set to SQ ON. (3) At keypad, presses FREQ key. (4) Observes display.

CREW MEMBER 1	CREW MEMBER 2
	Note: If hopset net ID F (n)(n)(n) displays, (n=0-9), hopset is loaded. Proceed to step b. If F (n)(n)(n) does not display, hopset is not loaded. Perform ICOM radio full load start procedures per Appendix B.
b. Verifies LS NUMBER and LS BANK switches are set to correct address.	b. Determines if TOD is loaded in ICOM radio as follows: (1) Presses • • •/Time key three times and observe display. (2) Verifies TOD clock is running and day, hour, minute, and second values agree with established reference time. Note: If TOD clock is running with correct time, proceed to step c. If TOD clock is not running with correct time, perform ICOM radio full load start procedures per Appendix B.
c. Sets STATUS LAMPS switch to NORMAL or DIM as desired.	c. Determines if COMSEC is loaded in ICOM radio as follows: (1) Connects handset H-250/U to AUD/DATA connector. (2) Sets CHAN to appropriate position. (3) Sets COMSEC to CT. (4) Connects W13P1 to J1 ANT connector. (5) Listens to handset.

CREW MEMBER 1	CREW MEMBER 2
	Note: If no sound is heard in the handset, press and release the push-to-talk button several times. If a beep is heard after each press, COMSEC is loaded. Proceed to step (6). If a steady beep or no beep is heard, COMSEC is not loaded. Perform ICOM radio full load start procedures per Appendix B. (6) Disconnects handset from AUD/DATA.
d. At the LCU, performs a BITE test as follows: (1) Checks that all five BITE lamps, A through E, are off. (2) Sets the BITE TEST/OFF/STATUS LAMP TEST switch to STATUS LAMP TEST. All STATUS lights come on. (3) Sets to BITE TEST: BITE lights cycle on and off for 6 seconds. All BITE lights come on. Test passed. Note: The LCHR READY light will light at the start of the test, flash off during test, and come back on at the end of the test. The following lights will light: • MISSILE: UPPER L, UPPER R, HAZARD: LWR R • MISSILE READY: LWR L • MISSILE: UPPER L, UPPER R, DISCONNECT: LWR L, LWR R	

CREW MEMBER 1	CREW MEMBER 2

(4) Sets BITE TEST/OFF/STATUS LAMP TEST switch to OFF.
All BITE TEST lamps and MISSILE HAZARD lamps go out.

DANGER

Visually check any missile light that is on. If position has a live missile with umbilical connected, immediately notify ECS, and advise ECS that the LS will remain in LOCAL mode. Leave area and await further instructions. Missile device may explode, resulting in injury or death.

Note: If not performing an automatic emplacement, refer to Appendix E.

16. Observes NFS operations after power-up.

a. At NFS (A10), opens access cover.

b. Observes NFS display as follows:

(1) If nnn.n AZIMUTH and POWER display, NFS passed self-test; proceeds to step 16f.

(2) If AZIMUTH does not display—

(a) Presses OFF.

(b) Presses ON.

Note: If not performing an automatic emplacement, refer to Appendix E.

16. Returns radio to operation as follows:

a. If radio silence is required—

(1) Sets FCTN to STBY.

(2) Connects W13P1 to J1 ANT.

(3) Connects W15P2 to AUD/DATA.

b. If radio silence is not required—

(1) Connects W13P1 to J1 ANT.

(2) Connects W15P2 to AUD/DATA.

CREW MEMBER 1	CREW MEMBER 2
	(3) Sets FCTN to SQ ON.
c. Observes all LCD characters display momentarily.	c. Sets RF PWR per communications plan.
d. Observes display flashes three times and WAIT displays momentarily.	d. Sets DATA RATE to 16000.
e. Observes on display, the last azimuth value stored in memory, and AZIMUTH.	e. Presses DATA/4 key.
(1) If the above indications were observed, NFS passed self-test.	
(2) If the above indications were <u>not</u> observed (or a failed message displayed), returns to step b (2) and reruns the procedure.	
f. Presses ALIGN.	f. Presses CHG/7 key until 16000 is displayed.
g. Closes and secures NFS access cover.	
17. Observes PLGR operations after power-up.	17. Performs LS late net entry as follows:
a. If PLGR display is off, performs the following:	a. Presses FREQ key and observes F (n)(n)(n) is displayed.
(1) Presses 1/ON/BRT key.	
(2) Verifies the display cycles from Blank, Copyright, and No Faults Found.	
b. If PLGR display screen is on, observes display for the following:	b. Presses SYNC/3 key and observes LF (n)(n)(n) is displayed until LS is synchronized with ECS.

CREW MEMBER 1	CREW MEMBER 2
(1) If the warning “LOW MEMORY BATTERY” appears, replaces memory battery or calls maintenance. (2) If “OLD” displays while PLGR is searching for a new position, it may take up to 15 minutes to get a new position. c. If one or both of the “OLD” displays are shown, PLGR has passed self-test. Proceeds to step 18. d. If current mode and position are shown, PLGR has passed self-test, and calculated the new position. Proceeds to step 18. e. If the above indications were not seen, PLGR has failed self-test and the following procedures must be performed: (1) Presses 0/OFF key, twice. (2) Reruns procedures, starting with step 17b. f. If PLGR fails a second time, or “FAILURES FOUND” displays, reports failure to the TCO and awaits instructions. 18. Verifies PLGR crypto. a. Presses 3/MENU key and observes MENU display appears; presses 3/MENU key again and observes MENU, page 2, appears. (1) If “CRYPTO” appears on fourth line of display, goes to step b. (2) If “CRYPTO” does not display on fourth line, crypto codes are not loaded. Reloads codes per Appendix D.	c. Verifies “L” disappears and LS is synchronized with ECS. d. At digital processor, presses COMPUTER RESET. e. After 15 seconds, observes that no module fault indicators are illuminated and LS DLU-DP BANK: (A-F), ADDRESS: (1-8) is displayed on front panel.

CREW MEMBER 1	CREW MEMBER 2
b. Presses 8/POS key and verifies current mode and position display.	
c. If current mode and position display, PLGR is operational.	
Note: If, after second attempt, current mode and position do not display, notify TCO that PLGR operational status cannot be verified. Proceed per TCO's instructions.	
19. If GMs are to be electrically connected, proceeds as follows; if not, proceeds to step 20.	19. If fiber-optic cable assembly was installed, ensures the slave bus unit A2A7 is powered up as follows:
a. Verifies all MISSILE HAZARD lights are off for each missile connected before continuing.	a. Opens and lowers cover.
b. Raises CONNECT/DISC switch cover.	b. Verifies 2S41 switch is on.
c. Holds CONNECT/DISC switches to CONNECT until MISSILE DISCONNECTED lights go off.	c. Verifies GO indicator is on.
d. Notes missile heat time and relays to ECS ASAP.	d. Raises and closes SBU cover.
	e. Closes and secures all doors to DLTM.

WARNING

Use care when closing radio access door. Injury to fingers or hands may occur.

CREW MEMBER 1	CREW MEMBER 2

Note: Units not equipped with AEE equipment will perform manual emplacement procedures using the LS M2 aiming circle and M1 gunner's quadrant, per Appendix E. The M2 aiming circle and M1 gunner's quadrant are used for backup to the automatic emplacement procedure in the event the PLGR/GPS is nonoperational.

WARNING
Ensure that personnel are clear of LS trailer prior to elevating and rotating the platform.

20. Assists CM 2 with elevating LS platform.

Note: Before continuing, verify both travel lockpins are removed and stowed.

f. Observes outrigger pads, as LS platform is rotated cw and then ccw.

20. Elevates LS platform as follows:

Note: Before continuing, verify both travel lockpins are removed and stowed.

a. Sets engagement control handle to ELEV.

Note: Launcher platform may be stopped at any position between limits by setting RAISE/STOP/LWR switch to STOP.

b. Sets RAISE/STOP/LWR switch to RAISE. Presses START switch. When platform stops, verifies that PLATFORM RAISED and LAUNCHER READY lamps are on.

c. Sets RAISE/STOP/LWR switch to STOP.

d. Sets engagement control handle to ROTATE. Verifies that AZIMUTH READY lamp is on.

e. Directs CM 1 to observe outrigger pads.

f. Rotates LS platform fully cw, then fully ccw.

CREW MEMBER 1	CREW MEMBER 2
	g. Returns LS platform to the stowed position.
	Note: If any outrigger lifts off the ground, sinks, or shifts during rotation, stop rotation. Adjust outrigger until firmly on the ground. Observe that LS is level within 5 degrees; if not, relevel and repeat steps 20e, f, and g.
	h. Turns off MCU.
i. Verifies curbside outrigger pads have firm contact with the ground.	i. Verifies roadside outrigger pads have firm contact with the ground.
j. Verifies LS is level.	j. Verifies LS is level.
Note: Do <u>not</u> perform step 21 if GM torque tube handle(s) will remain locked.	Note: Do <u>not</u> perform step 21 if GM torque tube handle(s) will remain locked.
21. Assists CM 2 as required with unlocking torque tube handles; verifies no missile hazards exist.	21. Unlocks torque tube handles (upper and lower) as follows:

WARNING
Observe actions of other crew member on launcher platform. Warn crew member of any unsafe conditions.

Note: GMs <u>must</u> be unlocked in the following order: upper right, lower right, upper left, and lower left.

CREW MEMBER 1	CREW MEMBER 2
	a. Mounts launcher platform.
	b. Cuts and removes safety wire.
	c. Removes quick-release pin by the GM torque tube handle.
d. Verifies status of MISSILE READY and MISSILE HAZARD lights as CM 2 unlocks torque handles.	d. Pulls the torque tube handle spring-loaded plunger; rotates it ccw to its unlocked position. Ensures the plunger locks in place and red shows to the left of torque tube handle.
	e. Installs the quick-release pin removed in step c.
	f. Repeats steps b through e for all four GMs in the following sequence: upper right, lower right, upper left, and lower left.
	g. Dismounts from LS platform.
22. Ensures guardrail around generator set is reinstalled if removed earlier.	22. Disconnects 28 vdc power cable and removes cable plug from tractor receptacle.

WARNING

With the DLU and fiber-optic cable installed, the curbside stowage box access cover is heavy. Two people are required to open or close access door.

23. Closes curbside stowage box if used.	23. Assists CM 1.
24. Goes to the tractor roadside and gets in.	24. Notifies section chief or assistant section chief that the LS is ready to be placed in remote.

CREW MEMBER 1	CREW MEMBER 2
Note: If LS is to be placed in remote, refer to step 29.	Note: If LS is to be placed in remote, refer to step 29.
25. Conveys the launcher location and alignment data to the ECS as soon as possible.	25. Removes and stores tractor wheel chocks.
26. When CM 2 enters cab of tractor, reports to the ECS operator that emplacement of LS number is complete.	26. Enters cab.
27. Proceeds to prearranged staging area a safe distance from LS.	27. Proceeds to prearranged staging area a safe distance from LS.

Note: The following procedures are necessary for transferring control of the LS to the ECS in order to obtain ready-for-action (fully operational) status. These procedures provide broad guidance for the LS crew members and are written in general terms to allow for tactical situation input. The procedures rely on a properly emplaced and energized LS. The LS has been properly sited at the designated location and is powered up. Equipment manning requirements and tactical actions conform to the SOA to which ordered. Required equipment checks have been performed to attain the necessary readiness posture in the time required.

WARNING

The LS platform can be rotated remotely from the ECS 1 minute after the LOCAL-RMT switch is set to RMT.

28. Requests verification with the ECS crew members that they are ready for LS (number) to be placed in remote and control to be transferred to the ECS.

29. When notified by ECS crew members, places LS in remote mode as follows:

a. Observes the following conditions exist at LCU:

(1) All BITE lights are off.

CREW MEMBER 1	CREW MEMBER 2

(2) POWER SUPPLIES lights are on.

(3) LAUNCHER READY and LOCAL lights are on.

(4) PLATFORM RAISED and AZIMUTH READY lights are on.

(5) MISSILE READY lights are on, if missile heaters were turned on and are set at operating temperatures.

(6) MISSILE HAZARD lights are off for all locations having live missiles with connected umbilicals.

(7) MISSILE DISCONNECTED lamps are off for all live missiles.

(8) LS NUMBER switch is set to the correct address.

(9) LS BANK switch is set to the correct address.

b. Inserts key in LOCAL-RMT switch and positions to RMT.

c. Ensures BITE lights begin to flash.

Note: For evaluation purpose, time stops after one complete cycle.

d. Closes LEM door.

e. Evacuates the area immediately.

30. Notifies the ECS that LS (number) is in remote and is ready for action.

CREW MEMBER 1	CREW MEMBER 2

Note: If manually emplaced, convey launcher location and alignment data to the ECS as soon as possible.
COACHING POINT: The performance measures are completed in the sequence outlined. All crew members do their like-numbered performance measures at the same time. When all the performance measures have been mastered and all crew members can do their jobs without coaching, go for speed and remember to be safety-conscious. The more the drill is performed, the better the crew members will perform together.

RUN-THROUGH INSTRUCTIONS: The crew members should practice this drill until they can perform the drill according to the standard without using the drill book. The initial run-through should be conducted slowly. The crew members should change positions in order to learn all steps and standards.

PERFORM: When the crew members can perform this crew drill to standards, inform the platoon sergeant or platoon leader that the crew members are ready to be evaluated.

SUPPORTED T&EOs

ARTEP NUMBER	T&EO NUMBER	T&EO TASK TITLE
44-637-30-MTP	44-5-9046	Conduct RSOP
44-637-30-MTP	44-2-9004	Emplace the Firing Battery

2-3. CREW DRILL 44-5-D014.

TASK: Prepare the LS for Road March (44-5-D014).

CONDITIONS: The battery has been ordered to occupy a new position. The LS is in the emplacement configuration. All components of the LS are available and operational. A crew has been assigned to prepare and march order the LS in all environmental and NBC conditions, both day and night. The march order command has been received.

STANDARDS: March order the LS by the performance measures as sequenced in this drill. Complete this drill within 25 minutes when in a training or evaluation environment.

Notes:

- Allow additional march order time when fiber-optic cables are installed.
- The time required to perform this drill in MOPP 4 will increase per ARTEP 44-637-30-MTP.

SUPPORTING INDIVIDUAL TASKS: Supporting individual tasks for this drill are listed in Appendix A, Individual Task-to-Drill Matrix.

ILLUSTRATIONS: Figure 2-2.

SETUP INSTRUCTIONS: The following equipment, areas, and personnel must be provided for the drill to be trained correctly.

a. Resources. As a minimum, the following is required: One LS, GM, semitrailer-mounted with basic issue items.

b. Training Site. The potential site must be large enough (10x20 meters) to perform all operations for march order. The site should be as level as possible. The maximum allowable slope from front to rear or side to side is 10 degrees.

c. Unit Instructions. The crew members must march order the LS.

TALK-THROUGH INSTRUCTIONS: The battery has received a movement order to redeploy to a new field position. The crew members have the responsibility to march order the LS within the prescribed time limits.

a. Orientation. Before beginning drill training, ensure that each crew member knows the purpose of the drill and is briefed on safety awareness.

b. Safety/Fratricide. All soldiers that operate the LS must know that safety hazards exist while operating the various items of equipment. These hazards can and have caused severe injuries to operators. Be extremely careful when working around the LS. Throughout the crew drill, observe all dangers, warnings, and cautions required to properly emplace the LS. All commanders, trainers, and leaders must plan, train, and stress all procedures that must be followed to avoid fratricide. These procedures include IFF, weapon control status, vehicle and aircraft recognition, corridors, routes, zones, flight levels, and other control measures. Munitions cannot distinguish between friend or foe.

c. Demonstration (optional). If a nearby crew has successfully performed the drill, have that crew demonstrate the drill. Explain what is being done and why, using the performance measures as a guide. After the demonstration, summarize.

d. Explanation. Explain the drill in the following manner:

(1) Using a diagram, Figure 2-2, a sand table, or a simple sketch in the dirt, show the crew members how the LS should be march ordered.

(2) Tell the crew members what their duties are in the drill.

(3) Read the performance measures of the drill to the crew members.

(4) Have crew members explain their performance measures to ensure that they understand them.

WALK-THROUGH INSTRUCTIONS:

a. Have crew members take their positions and perform the drill. Use the crawl-walk-run method of training. Start the training slowly. Correct any mistakes the crew members make as they go; do not proceed until drill procedures are performed correctly. After the crew members demonstrate their proficiency at a slow pace, let them do it faster. Remember, however, that safety is never sacrificed for speed. Watch carefully to make sure the crew members achieve all of the standards for the drill.

b. Initiating Cue. The march order command has been received.

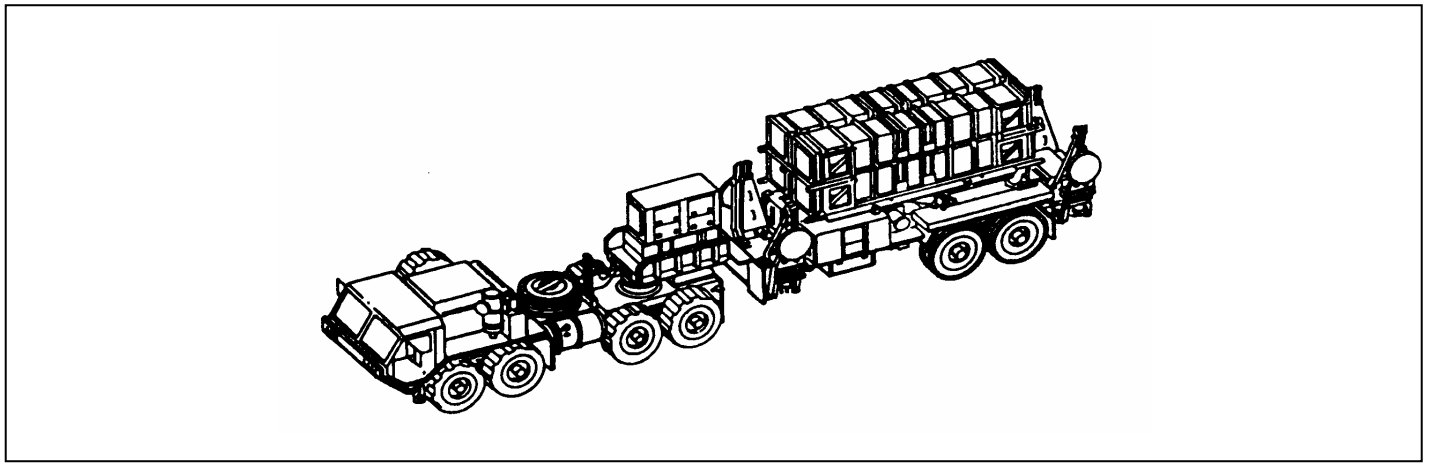


Figure 2-2. LS in March Order Configuration.

PERFORMANCE MEASURES: The crew members listed below complete their performance measures as they are stated and in the sequence shown. They must synchronize the completion of like-numbered performance measures.

Note: Once the guided missiles are removed, there are no explosives on the LS. The LS is unclassified if the data link security equipment is removed.

Note: Before proceeding with this drill, read WARNINGS below.

WARNING

Do not move the missile after an accidental drop exceeding a distance of 12 inches. Notify the battery commander and wait for instructions.

WARNING

Confirm with the ECS operator that the LS is in the LOCAL mode before approaching LS. If the LS is in the REMOTE mode, the turntable can be remotely trained by the ECS. Stay clear of the turntable rotation until the LOCAL-RMT switch on the LCU is set to LOCAL, the LOCAL lamp is on, and the key is removed.

WARNING

Always observe actions of crew members on launcher platform and warn crew members of any unsafe conditions.

WARNING

Wear hearing protection with 10 meters of operating the LS. May cause hearing loss.

Note: The DLTM processor A2A4 LCD display must indicate “LS DLU-DP” before proper indications can be obtained on the MSL HAZARD lights. A MSL HAZARD light on the LCU panel indicates a hazardous condition for locations having a live missile with umbilical connected only. The MSL HAZARD light will be on for all locations having a dummy missile, empty canister, empty location, or a live missile with umbilical disconnected but these conditions do not constitute a hazard. If any of the MSL HAZARD indicator lamps are lit, verify with ECS that a missile is present. When it is determined that a live missile is present with umbilical connected, immediately notify the ECS of the condition indicated and advise that the LS will remain in the LOCAL mode. After notifying the ECS, evacuate the area and await further instructions

CAUTION

Be very alert at night. Ensure that working area is clear before starting. Make all movements sure and deliberate. Do not rush.

CREW MEMBER 1	CREW MEMBER 2

Note: If fiber-optic cable assembly road march is required, refer to Appendix E.

1. Receives and confirms march order with the ECS.

Note: For evaluation purpose, time starts here.

2. Checks fire extinguisher curbside.

1. Receives and confirms march order with the ECS.

2. Checks fire extinguisher and the ground on the roadside.

a. At LEM, sets LOCAL/RMT switch to LOCAL.

b. Verifies the LOCAL light comes on.

c. Removes key and notifies CM 1 LS is in LOCAL and the key removed.

d. Sets STATUS LAMPS switch as desired.

CREW MEMBER 1	CREW MEMBER 2
3. Assists CM 2 and ensures personnel are clear of LS trailer if launcher rotation is required.	3. Verifies the launcher is in the stow position. If not, rotates the LS to the stow position by performing the following: a. Verifies ENGAGEMENT CONTROL handle is set to ROTATE. b. On the LCU, presses and holds the CCW/STOP/CW switch to the position that rotates the turntable to the stow position. c. Turns off MCU.
4. Locks GM torque tube handles and disconnects GMs.	4. Assists CM 1 as required with locking GM torque tube handles and disconnecting GMs.
Note: Coordinate with CM 2 to verify that MISSILE READY lights at the LCU go out.	
a. Locks GM torque tube handle(s) in the following order: (1) Upper right. (2) Lower right. (3) Upper left. (4) Lower left.	a. At the LCU, looks to the rear of launcher for signal from CM 1 as he locks each torque tube handle, then observes MISSILE READY lights.
b. Beginning with upper right GM, removes quick-release pin by torque tube handle.	

CREW MEMBER 1	CREW MEMBER 2
c. Pulls out and holds spring-loaded plunger on torque tube handle. Rotates it cw to locked position. Ensures plunger locks in place and no red shows to the left of torque tube handle.	
d. Installs the quick-release pin.	
e. After installing quick-release pin, moves to the launcher roadside corner.	
f. Announces to CM 2, “Restraint pin locked.”	f. After receiving signal from CM 1, observes that the corresponding MISSILE READY light goes out.
g. Waits for the signal from CM 2 that MISSILE READY light corresponding to torque tube handle goes out.	g. As each light goes out announces, “No missile hazard, MISSILE READY light out,” to CM 1, for each missile.
h. Repeats steps a through g for each GM.	h. Repeats steps a through g for each GM.
i. Dismounts from LS platform.	i. At the LEM-LCU, verifies all MISSILE READY and MISSILE HAZARD lights are off.
	j. Raises cover and holds CONNECT-DISC switches to DISC at all positions until corresponding MISSILE-DISCONNECTED lights go on.

Note: If tractor is already positioned, proceed to step 7. CM 1 and CM 2 will coordinate for positioning the LS tractor in front of the LS semitrailer for coupling.

WARNING

<u>Prior</u> to movement, ensure personnel are clear of tractor, to prevent injuries.

CREW MEMBER 1	CREW MEMBER 2
5. Assisted by CM 2, positions LS tractor for coupling to semitrailer.	5. Assists CM 1 with positioning LS tractor for coupling to semitrailer.
	a. Clears personnel from area of LS trailer as tractor approaches.
b. Guided by CM 2, backs the tractor in front of trailer so the fifth wheel is just in front of kingpin.	b. Guides CM 1 in backing the tractor in front of trailer so the fifth wheel is just in front of trailer kingpin.
c. Halts vehicle and sets parking brake.	c. Commands, “Halt vehicle”.
d. Sets the tractor shift lever to NEUTRAL. Leaves engine running.	

WARNING
Tractor wheels must be chocked before driver leaves cab.

6. When notified by CM 2 that chocks are emplaced, exits vehicle.	6. Obtains chocks; chocks LS tractor.
	a. Places one chock in front of curbside rear tandem wheel and the other chock at rear of roadside rear tandem wheel (refer to Appendix B).
	b. Notifies CM 1 that tractor wheels are chocked.
Note: Carefully route cables and air brake lines from tractor to semitrailer. Be careful not to get grease from fifth wheel on lines or cables.	Note: Uphill—place chocks behind tractor rear tandem wheels curbside and roadside. Downhill—place chocks in front of tractor rear tandem wheel curbside and roadside.

CREW MEMBER 1	CREW MEMBER 2

WARNING
Make sure area is clear before lowering platform, to prevent injury.

7. Connects tractor air lines and electrical cables to semitrailer as follows:

a. Front of semitrailer:

(1) Removes dummy couplings from SERVICE and EMERGENCY air brake hose connectors.

(2) Removes dust cap from power supply connector.

b. Prepares outrigger power cable and intervehicular light cable by connecting outrigger power cable to tractor slave connector.

c. Connects the intervehicular light cable and the outrigger power cable to semitrailer connectors.

7. Lowers launcher platform.

a. Sets ENGAGEMENT CONTROL handle to ELEV.

b. At the LEM-LCU, verifies the AZIMUTH READY light is off.

c. Lowers the launcher platform as follows:

Note: Launcher platform may be stopped by setting the RAISE/STOP/LWR switch to STOP.

(1) Sets RAISE/STOP/LWR switch to LWR.

(2) Presses and releases START button. The platform will lower to the steady rest position and stop.

(3) Checks that PLATFORM RAISED light is off.

CREW MEMBER 1	CREW MEMBER 2
	(4) Sets RAISE/STOP/LWR switch to STOP.

CAUTION

Ensure ENGAGEMENT CONTROL handle is not in road march position while traveling. Otherwise, azimuth gear train may be damaged.

d. Disconnects air brake lines from connector tree and connects air lines to trailer.

d. Sets ENGAGEMENT CONTROL handle to ROAD MARCH.

e. At tractor fifth wheel—

(1) Pulls out secondary lock release handle; locks in out position.

(2) Pulls out primary lock release handle; locks in out position

f. Verifies fifth wheel jam plate is just below the trailer gooseneck.

Note: If necessary, push down fifth wheel tail ramps so ramps are level with, or below, top surface of guide ramps.

8. De-energizes LEM-PDU.

a. Opens LEM doors.

8. De-energizes DLT.

a. Removes padlock and opens DLTM doors.

Note: If power-down is not to exceed 24 hours and radio AN/VRC-90A holding memories are to be saved or TOD synchronization is required, perform step b. If power-down is to exceed 24 hours or radio AN/VRC-90A holding memories are not to be saved and TOD synchronization is not required, perform step c.

CREW MEMBER 1	CREW MEMBER 2

WARNING
Open radio access door carefully to avoid injury to fingers and hands.

b. Powers down the LEM-PDU in the sequence listed; sets the following circuit breakers to OFF:

(1) MISSILE HEATER AC switches.

- LWR R MSL.
- LWR L MSL.
- UPPER R MSL.
- UPPER L MSL.

(2) CNVC OUT CANISTER HTR AC.

(3) MSL TWT FIL PWR SPLY.

(4) MSL PAFU/ITL PWR SPLY.

(5) MOT CONT UNIT AC.

b. At radio, AN/VRC-90A—

(1) Sets FCTN switch to STBY.

(2) Sets CB1 to OFF.

Note: If codes are lost, replace the holdup battery

CREW MEMBER 1	CREW MEMBER 2
(6) LAUNCHER ELECTRONICS AC switches. • MSL GYRO/CLOCK PWR SPLY. • MSL 5 DC PWR SPLY. • LCHR ELEX 28 VDC PWR SPLY. • ORD PWR SPLY. • LCHR ELEX 5 VDC PWR SPLY. • MAIN B. • MAIN A. • BLOWER. (7) LAMPS.	
c. Notifies CM 2 that LEM is powered down. Closes and secures LEM doors.	c. At radio AN/VRC-90A, sets COMSEC to Z. (1) Sets FCTN to Z-FH. (2) Sets FCTN to OFF. (3) Sets CB1 to OFF.
9. Assists as needed.	9. De-energizes DLTM-PDU. a. In sequence listed, sets the following circuit breakers to OFF: (1) PROCESSOR FAULT IND. (2) DGTL PROCESSOR. (3) SBU.

CREW MEMBER 1	CREW MEMBER 2
	(4) PWR SPLY.
	(5) RADIO.
	(6) BLOWER.
	(7) MAPS.
	(8) MAPS (AEE).
	(9) LAMPS to OFF.
b. Secures air inlet and exhaust covers.	b. Notifies CM 1 to secure air inlet and exhaust covers.
	c. Closes and secures DLTM doors.
10. At LEM PCP, sets MAIN POWER-AC CB1 to OFF.	10. Removes torque wrench, socket, and extension from storage point in preparation for verifying torque values.

WARNING
While on the LS, crew members must watch for and warn each other of unsafe conditions that can cause injury.

Note: If equipped with TQG, allow 5 minutes for cool down. Otherwise, all 3 minutes for cool down.

WARNING
Data link mast may be hot. Wear protective gloves to prevent injury to hands.

CREW MEMBER 1	CREW MEMBER 2

CAUTION
Handle the antenna carefully to prevent damage

11. Stows data link mast assembly.

a. Removes dust cap from dummy RF connector.

b. Disconnects RF cable; connects cable to RF dummy connector.

c. Installs dust cap on RF adapter.

d. Disconnects ground cable from ground connector. Installs dust caps.

e. Stows ground cable in spring clip on antenna.

11. Assists as needed.

CAUTION
Use extreme care when stowing DLU antenna into storage tube so as <u>not</u> to damage the GPS antenna assembly.

f. Slides antenna element out of lower mast assembly and passes to CM 2 for stowing.

f. Takes antenna element from CM 1 and stows into antenna storage tube; secures with two latches.

12. When notified by CM 2 that antenna has been stored, closes DLTM and LEM air inlet and exhaust covers.

12. Notifies CM 1 that antenna has been stored and assists as needed.

CAUTION
Ensure both travel lock pins are completely installed. Failure to do so can cause damage to equipment.

CREW MEMBER 1	CREW MEMBER 2
13. Installs travel lockpins.	13. Verifies torque value of canister tie-down bolts (refer to Appendix I).
14. Raises and folds over work platforms and secures after CM 2 is finished torquing GMCs on roadside.	14. Continues verifying torque values.

Note: If launching station is equipped with a TQG, CM1 will skip step 16 and go to step 17.

WARNING
To prevent injury, do <u>not</u> step on LS cables or cable bundles.

15. Shuts down generator set.

    a. Climbs up to generator set platform.

    b. Opens control cubicle doors.

    c. Sets START/RUN/STOP switch to STOP.

    d. Verifies engine stops.

    e. Pulls out DC CONTROL CIRCUIT BREAKER.

    f. Loses and latches control cubicle and air vent doors.

    g. Assists with verifying torque values.

15. Continues verifying torque values.

CREW MEMBER 1	CREW MEMBER 2
16. Shuts down generator set (TQG MEP 814). a. Climbs up to generator set platform. b. Opens access doors. c. After 5 minutes of operation without a load applied, places MASTER switch to OFF position. d. Verifies engine stops. e. Places DEAD CRANK switch in OFF position. f. Closes and latches access doors. g. Assists with verifying torque values.	16. Continues verifying torque values of GMCs.

WARNING

Keep fingers outside outrigger control box until the box is locked open. The cover snaps open and can injure fingers.

WARNING

<u>Prior</u> to operation, ensure <u>all</u> personnel are clear of outriggers.

CREW MEMBER 1	CREW MEMBER 2
17. Assists and observes outrigger operations. a. Proceeds to rear LS trailer and notifies CM 2 area is clear and safe for outrigger operation.	17. Raises outriggers. a. At outrigger control box, opens and secures cover. b. Lifts red safety guard for POWER ON/OFF switch and sets to ON. Ensures power light is on. Note: For unleveled sites, outriggers may have to be operated one at a time.

CAUTION

Ensure outriggers are free of debris. Do <u>not</u> use outrigger switches in diagonal pairs. To lower outriggers to the ground, use the corresponding single switch per outrigger.

Note: Switch control outriggers as shown in Table 2-2. Use a single outrigger control switch, if one outrigger must be moved more than another.

Table 2-2. Control Outriggers.

SWITCHES	OUTRIGGERS
Right top and bottom	Two front
Left top and bottom	Two rear
Top two	Roadside
Bottom two	Curbside

CREW MEMBER 1	CREW MEMBER 2

CAUTION
To prevent equipment damage, ensure outrigger pads have free movement when raising outriggers.

c. Observes rear outriggers; notifies CM 2 to stop raising outriggers when outrigger pads are about 1 to 2 feet above the ground.	c. Coordinates with CM 1. In tandem, pulls up and holds two rear outrigger control switches until rear outriggers are about 1 to 2 feet above ground, and then stops.
d. Checks rear outrigger pads for free movement.	
e. Notifies CM 2 to continue raising rear outriggers to stow position.	e. When notified by CM 1, continues to raise rear outriggers to stow position.
f. Places rear tire chock blocks and attaches rear outrigger safety chains. Notifies CM 2 when clear.	
g. Proceeds to roadside front of LS semitrailer and observes forward outrigger.	g. Coordinates with CM 1. Uses front outrigger control switches to adjust height of semitrailer so semitrailer kingpin plate is aligned with tractor fifth wheel ramp plate.
	h. Sets outrigger control POWER ON/OFF switch to OFF. Lowers red safety guard.
18. Couples LS tractor to semitrailer.	18. Couples LS tractor to semitrailer.

CAUTION
Remove mud flaps from tractor if installed. Damage to mud flaps or outrigger control box can occur if left installed during road march.

CREW MEMBER 1	CREW MEMBER 2
a. Removes mud flaps from tractor, if installed.	a. Assists CM 1 with removal of mud flaps.
b. Enters tractor cab; pushes in parking brake control knob.	b. Removes tractor wheel chocks, curbside and roadside. Verifies primary and secondary locks on fifth wheel.

DANGER

Do not permit anyone to stand directly behind tractor or semitrailer during coupling procedure. Death or serious injury to personnel can result.

CAUTION

Ensure all cables and air hoses are clear of tractor fifth wheel and semitrailer kingpin plate.

CAUTION

Do not run kingpin up guide ramps or into throat of the fifth wheel. Damage to kingpin guide ramps or fifth wheel may result

c. Maneuvers LS tractor back under semitrailer. Stops when signaled by CM 2.	c. Proceeds to roadside front of semitrailer. Using hand signals, guides tractor slowly back under semitrailer so kingpin is aligned with throat of fifth wheel. Signals CM 1 to stop.
Note: During tractor and semitrailer coupling operations, tractor operator should hold TRAILER HAND BRAKE control in ON position to apply semitrailer brakes.	Note: Check that kingpin is in fifth wheel throat. Daylight should not be seen between top of fifth wheel and bottom of semitrailer.

CREW MEMBER 1	CREW MEMBER 2
d. Continues to slowly back tractor after picking up semitrailer and after fifth wheel jaws lock around kingpin. Stops when signaled by CM 2.	d. Slowly guides tractor back until fifth wheel coupling jaws are engaged around semitrailer kingpin. Primary and secondary lock handles shift into locked (in) position; signals CM 1 to stop.
e. Sets parking brake and places shift lever to NEUTRAL. Leaves engine running. Notifies CM 2 to chock wheels.	e. When notified by CM 1, chocks tractor wheels (roadside and curbside).
f. When notified by CM 2 that chocks are emplaced, exits vehicle.	f. Notifies CM 1 that chocks are emplaced.
19. Observes front roadside outrigger; notifies CM 2 when outrigger is just clear of the ground.	19. Raises front outriggers.
a. Verifies fifth wheel primary and secondary lock handles are in lock position.	a. At outrigger control box, lifts red safety guard for POWER ON/OFF switch; sets to ON. Ensures power light is on.
b. Assists CM 2.	b. In tandem, pulls up and holds front outrigger control switches.
c. Signals CM 2 to raise outriggers just clear of the ground.	c. Raises front outriggers until just clear of the ground.
	d. Turns off power at the outrigger control panel.
20. Performs tractor and semitrailer jerk test.	20. Performs tractor and semitrailer jerk test.
a. Returns to cab of tractor. Ensures AIR PRESS gauge indicates at least 100 psi (690 kPa).	a. Removes tractor wheel chocks (curbside and roadside).
b. When notified by CM 2 that LS is ready for jerk test, inches tractor forward to check coupling.	b. Notifies CM 1 that LS is ready for jerk test. Has CM 1 check coupling by inching tractor forward. If secure, stops.
	Note: If coupling is not secure, have CM 1 slowly rock tractor back and forth until kingpin is securely locked in fifth wheel.

CREW MEMBER 1	CREW MEMBER 2
c. Sets parking brake and places shift lever to NEUTRAL. Leaves engine running. Notifies CM 2 to chock wheels.	c. When notified by CM 1, chocks tractor wheels (roadside and curbside).
d. When notified by CM 2 that chocks are emplaced, exits vehicle.	d. Notifies CM 1 that chocks are emplaced.
e. Verifies fifth wheel primary and secondary handles are locked in place.	

CAUTION

To prevent equipment damage when raising outriggers, CM 1 and CM 2 must observe outrigger pads to ensure they have free movement and are free of obstruction all the way up to the stow position.

21. Stows front outriggers.	21. Stows front outriggers.
a. Observes front outrigger. Ensures area is clear and notifies CM 2.	a. When notified by CM 1 that front roadside area is clear, turns power on at the outrigger control panel.
b. Notifies CM 2 to stop raising outriggers when outrigger pad is about 1 to 2 feet above the ground.	b. At outrigger control panel, in tandem, pulls up and holds front outrigger control switches until front outriggers are 1 to 2 feet above ground, then stops.
c. Checks outrigger pad for free movement; notifies CM 2 to continue raising outriggers to stow position.	c. Checks curbside outrigger pad for free movement. When notified by CM 1, continues to raise outriggers to stow position.
	d. Sets POWER ON/OFF switch to OFF; closes and secures cover.

CAUTION

Prior to road travel, ensure outrigger safety chins are connected.

CREW MEMBER 1	CREW MEMBER 2
e. Connects roadside front outrigger safety chain.	e. Connects curbside front outrigger safety chain.
22. Disconnects ground cable.	22. Assists CM 1 with disconnecting ground cable and stows the ground cable.
23. Assists CM 2 with removing ground rods.	23. Removes as many sections of ground rod as terrain and time permit. Stows any ground rods removed.
24. Prepares for road march.	24. Prepares for road march.
a. Enters tractor cab.	a. Retrieves and stows roadside fire extinguisher and chock blocks.
b. Establishes communications and informs the ECS or convoy commander that LS is ready for road march. Assists CM 2 with light check.	b. Checks front tractor lights.
	c. Retrieves and stows curbside fire extinguisher and chock blocks.
d. Performs rear trailer light test.	d. Checks rear trailer lights.
e. Moves tractor forward slowly and stops to check brakes.	e. Assists as needed.
Note: For evaluation purpose, time stops here.	
f. Waits for orders to move; moves on command.	f. Enters tractor cab.

COACHING POINT: The performance measures are completed in the sequence outlined. All crew members do their like-numbered performance measures at the same time. When all the performance measures have been mastered and all crew members can do their jobs without coaching, go for speed and remember to be safety-conscious. The more the drill is performed, the better the crew members will perform together.

RUN-THROUGH INSTRUCTIONS: The crew members should practice this drill until they can perform the drill according to the standard without using the drill book. The initial run-through should be conducted slowly. The crew members should change positions in order to learn all steps and standards.

PERFORM: When the crew members can perform this crew drill to standards, inform the platoon sergeant or platoon leader that the crew members are ready to be evaluated.

SUPPORTED T&EOs

ARTEP NUMBER	T&EO NUMBER	T&EO TASK TITLE
44-637-30-MTP	44-2-9044	Perform March Order
44-637-30-MTP	55-2-C324	Conduct a Convoy

2-4. CREW DRILL 44-5-D015.

TASK: Perform Missile Reload Procedures (44-5-D015).

CONDITIONS: Perform this crew drill from either the centralized (designated location) or decentralized (tactical) positions. The launching station (LS) is emplaced, operational, and in remote control. A crew has been assigned for missile reload in all environmental and NBC conditions, both day and night. The command missile reload has been received.

STANDARDS: Perform the missile reload procedures by the performance measures as sequenced in this drill. Complete this drill within 60 minutes when in a training or evaluation environment.

Note: The time required to perform this drill in MOPP 4 will increase per ARTEP 44-637-30-MTP.

SUPPORTING INDIVIDUAL TASKS: Supporting individual tasks for this drill are listed in Appendix A, Individual Task-To-Drill Matrix.

ILLUSTRATIONS: Figures 2-3 through 2-14.

SETUP INSTRUCTIONS: The following equipment, areas, and personnel must be provided for the drill to be trained correctly.

a. Resources. As a minimum, the following are required: One LS, GM (semitrailer-mounted), one M985E1 HEMTT 10-ton truck, Patriot guided missile transporter (GMT) with missile canisters, and all basic issue items, to include the following:

- Missile-round cable test set (MRCTS)
- Two 30 to 150 foot-pound torque wrenches
- Two 30-inch extensions (PAC-2) or two 36-inch extensions (PAC-3)
- Two 3/4-inch deep sockets
- Work gloves (one pair for each)
- Protective head gear (Kelvar) for each
- Two tag lines with snap hooks

b. Training Site. Emplace the LS in an area large enough for the M985E1 GMT and a missile off-load area (20x25 meters). The site should be as level as possible. The maximum allowable slope from front to back or side to side is 10 degrees.

c. Unit Instructions. Prepare the LS for missile reload with an available crew from the launcher section. The LS can be transported to a predetermined reload area (centralized) other than its tactical deployment position (decentralized). Canisters on the LS are empty. The LS is grounded prior to reload procedures.

(1) Centralized: The LS march order procedures and LS emplacement procedures, steps 1 through 9 for s 1 and 2, are performed according to this book. Crew members 1 and 2 will begin with step 7 of this missile reload drill procedure.

(2) Decentralized: Crew members 1 and 2 will begin with step 1 of this missile reload drill procedure and perform steps 1 through 9 before the GMT arrives. If time permits, perform the MRCTS check in Appendix H following step 8.

1—LS 1.
2—LS 2.
3—LS section chief (Safety NCO).
4—GMT signaler.
5—GMT crane operator.

Note: Crew members 4 and 5 may be interchanged as signaler or crane operator.

TALK-THROUGH INSTRUCTIONS

a. Orientation. Before beginning drill training, ensure that each knows the purpose of the drill and is briefed on safety awareness. The unit has ordered the LS to be reloaded in either centralized or decentralized positions. The crew members have the responsibility to perform missile reload procedures as directed.

b. Safety/Fratricide. All soldiers who operate the LS GMT must know that safety hazards exist while operating the various items of equipment. These hazards can and have caused severe injuries to operators. Be extremely careful when working around the LS. Throughout the crew drill, observe all dangers, warnings, and cautions required to properly perform missile reload procedures. All commanders, trainers, and leaders must plan, train, and stress all procedures that must be followed to avoid fratricide. These procedures include IFF, weapons control status, vehicle and aircraft recognition, corridors, routes, zones, flight levels, and other control measures. Munitions cannot distinguish between friend or foe.

Notes:
- Observe all dangers, warnings, and cautions throughout this missile reload drill.
- All s should have as much eye contact as possible with each other while performing missile reload procedures. Light-all operations should be authorized to prevent personal injury and equipment damage, when performing missile reload operations during the hours of darkness.

c. Demonstration (optional). If a nearby crew has successfully performed the drill, have that crew demonstrate the drill. Explain what is being done and why, using the performance measures as a guide. After the demonstration, summarize.

d. Explanation. Explain the drill in the following manner:

(1) Using a diagram, Figures 2-3 through 2-14, a sand table, or a simple sketch in the dirt, show the crew members how missile reload should be done.

(2) Tell the s what their duties are in the drill.

(3) Read the performance measures of the drill to the crew members.

(4) Have crew members explain their performance measures to ensure that they understand them.

WALK-THROUGH INSTRUCTIONS:

a. Have crew members take their positions and perform the drill. Use the crawl-walk-run method of training. Start the training slowly. Correct any mistakes the s make as they go; do not proceed until drill procedures are done correctly. After the crew members demonstrate their proficiency at a slow pace, let them do it faster. Remember, however, that safety is never sacrificed for speed. Watch carefully to make sure the crew members achieve all of the standards for the drill.

b. Initiating Cue. The missile reload command has been received.

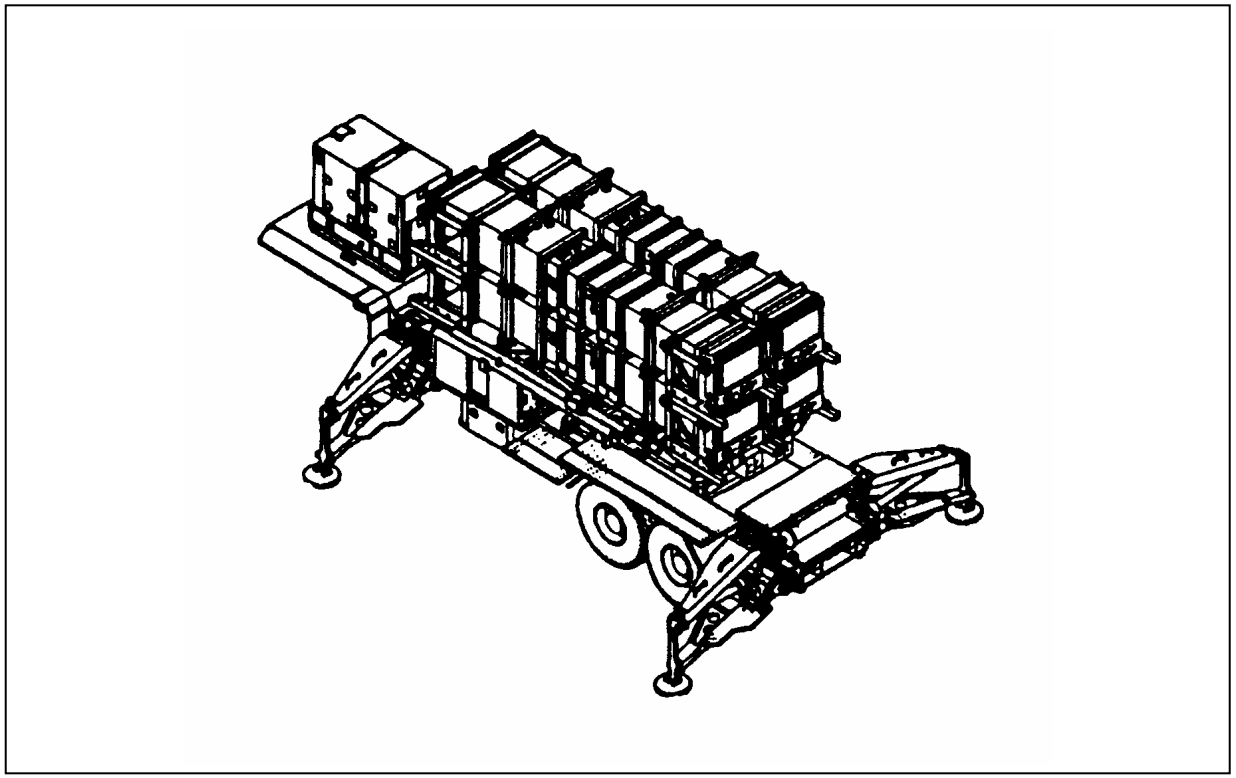


Figure 2-3. LS Missile Reload Position.

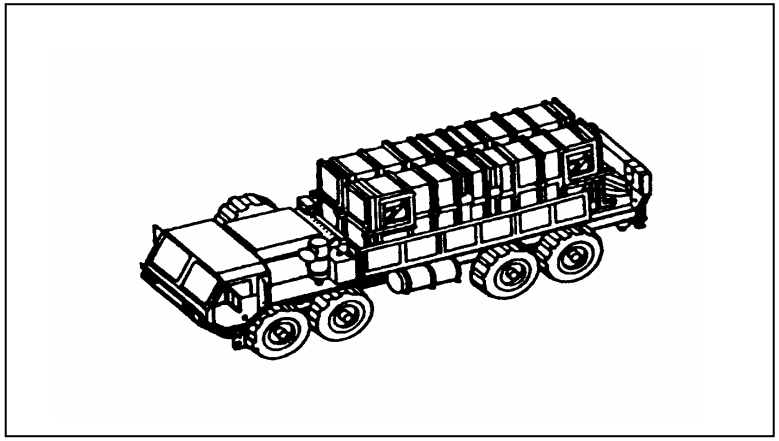


Figure 2-4. Guided Missile Transporter.

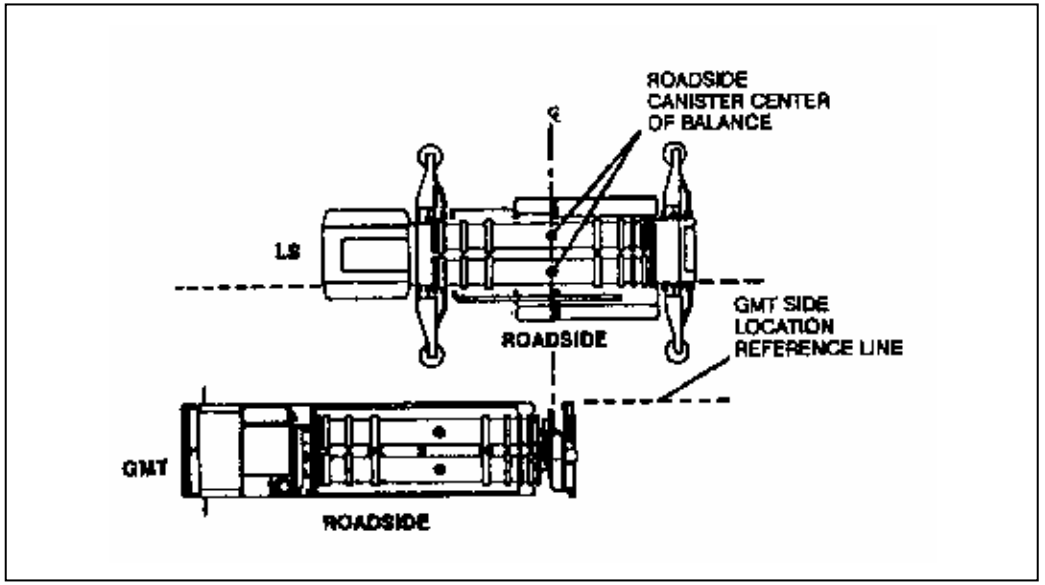


Figure 2-5. LS/GMT Parallel Reload Positions.

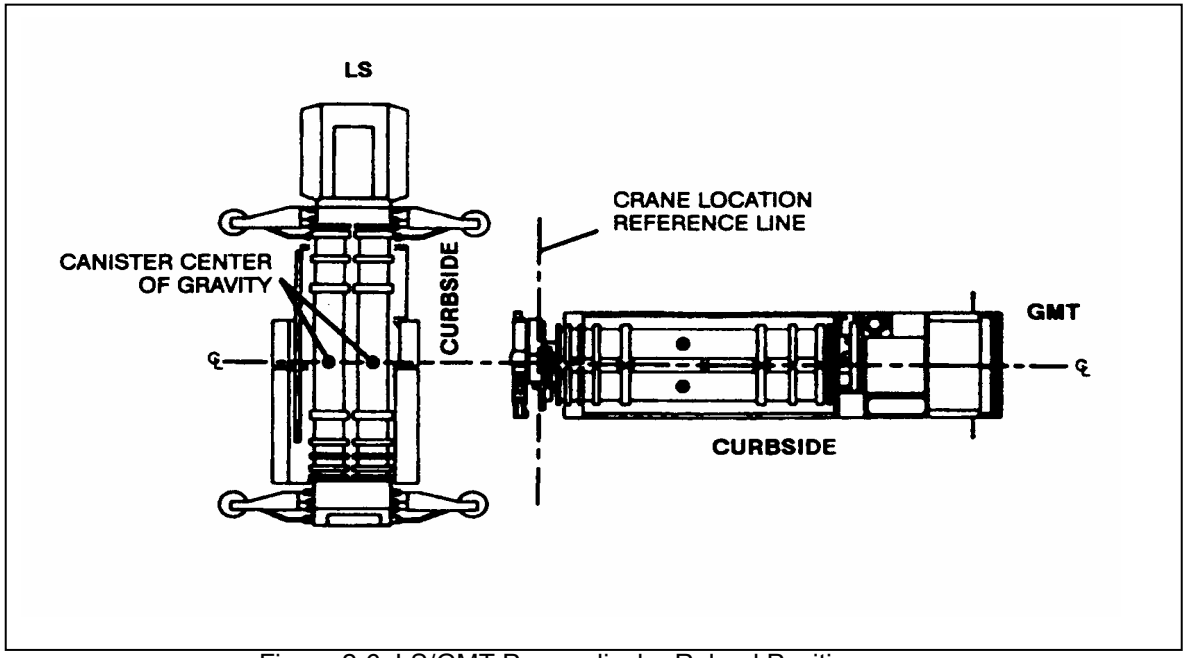


Figure 2-6. LS/GMT Perpendicular Reload Positions.

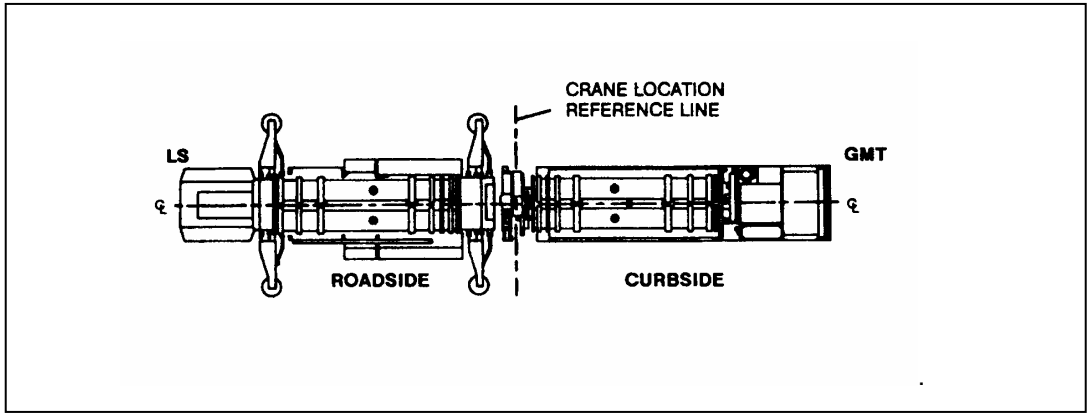


Figure 2-7. LS/GMT End-to-End Reload Positions

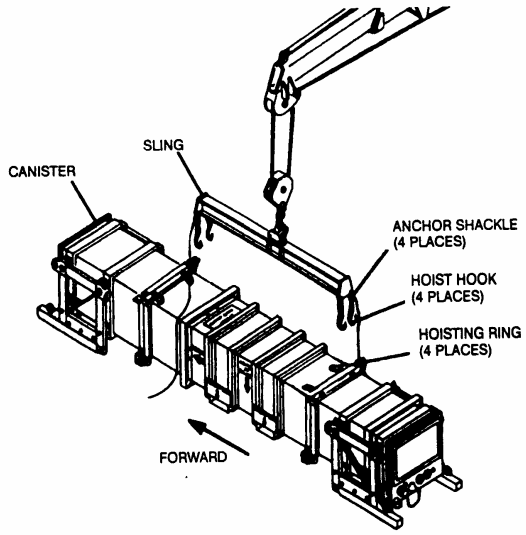


Figure 2-8. Sling/Canister Hookup.

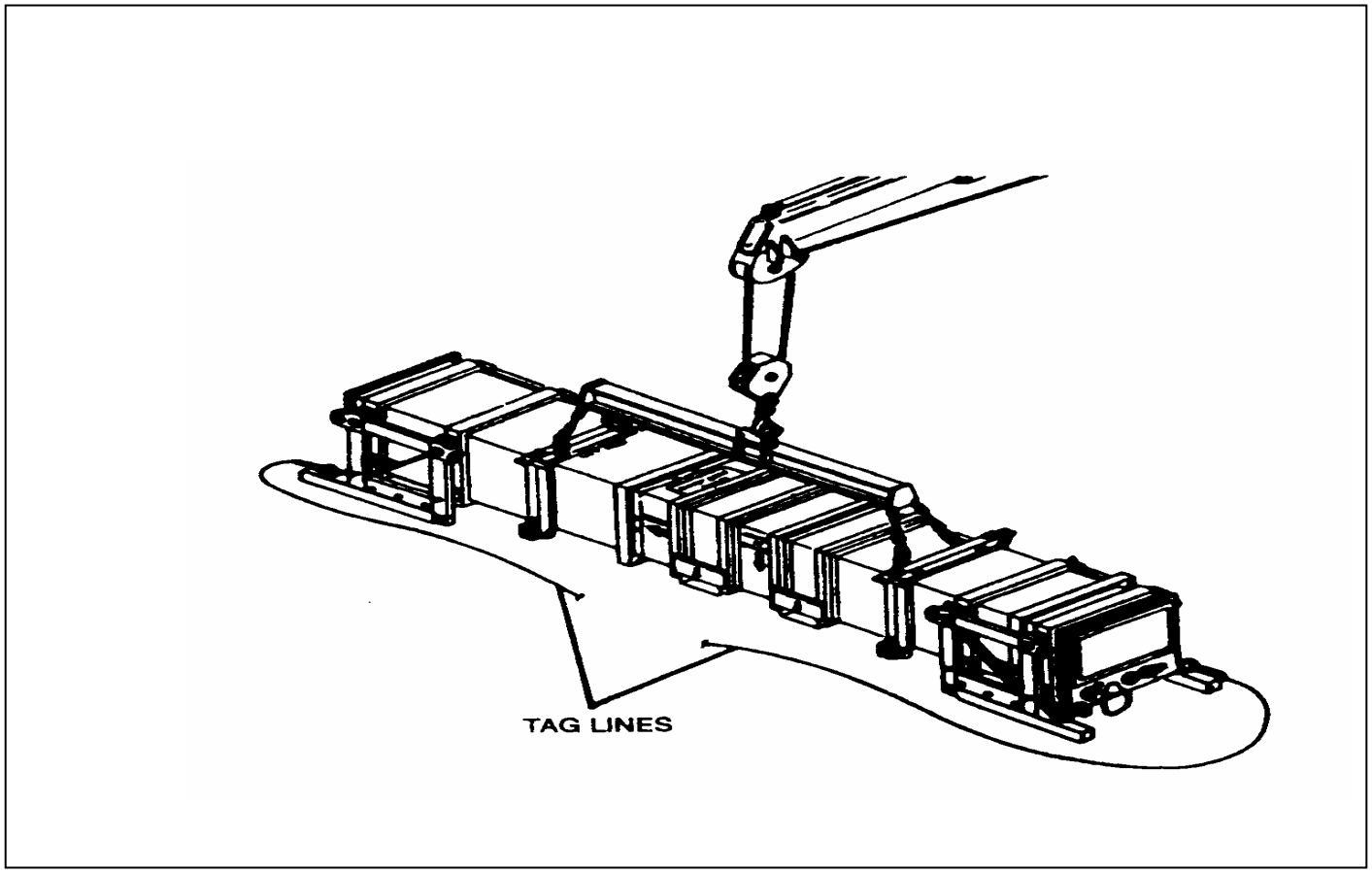


Figure 2-9. Tag Lines Hookup

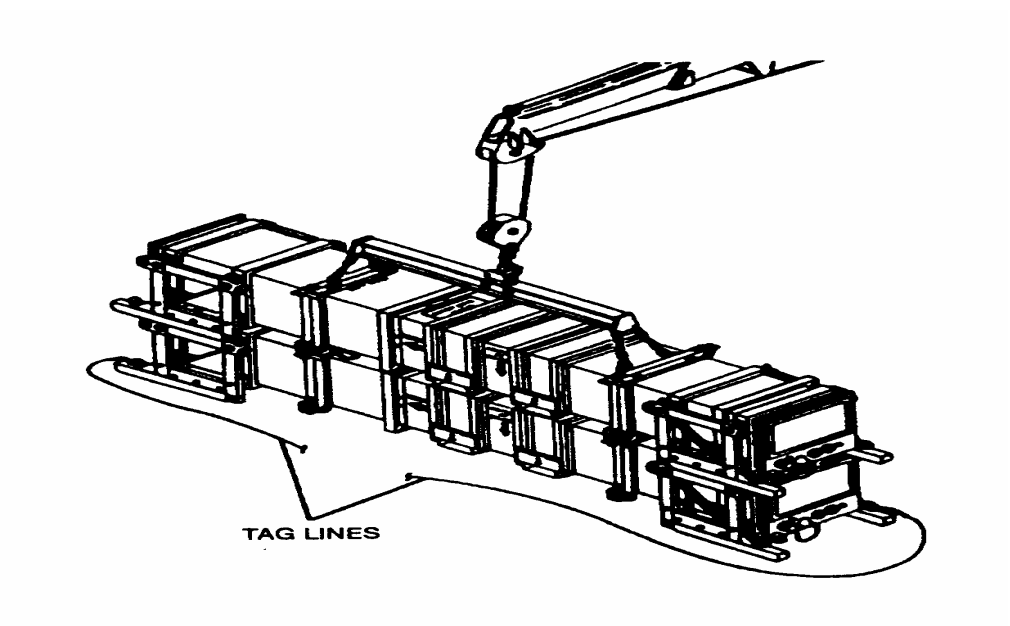


Figure 2-10. Two-Stack Tag Line Hookup.

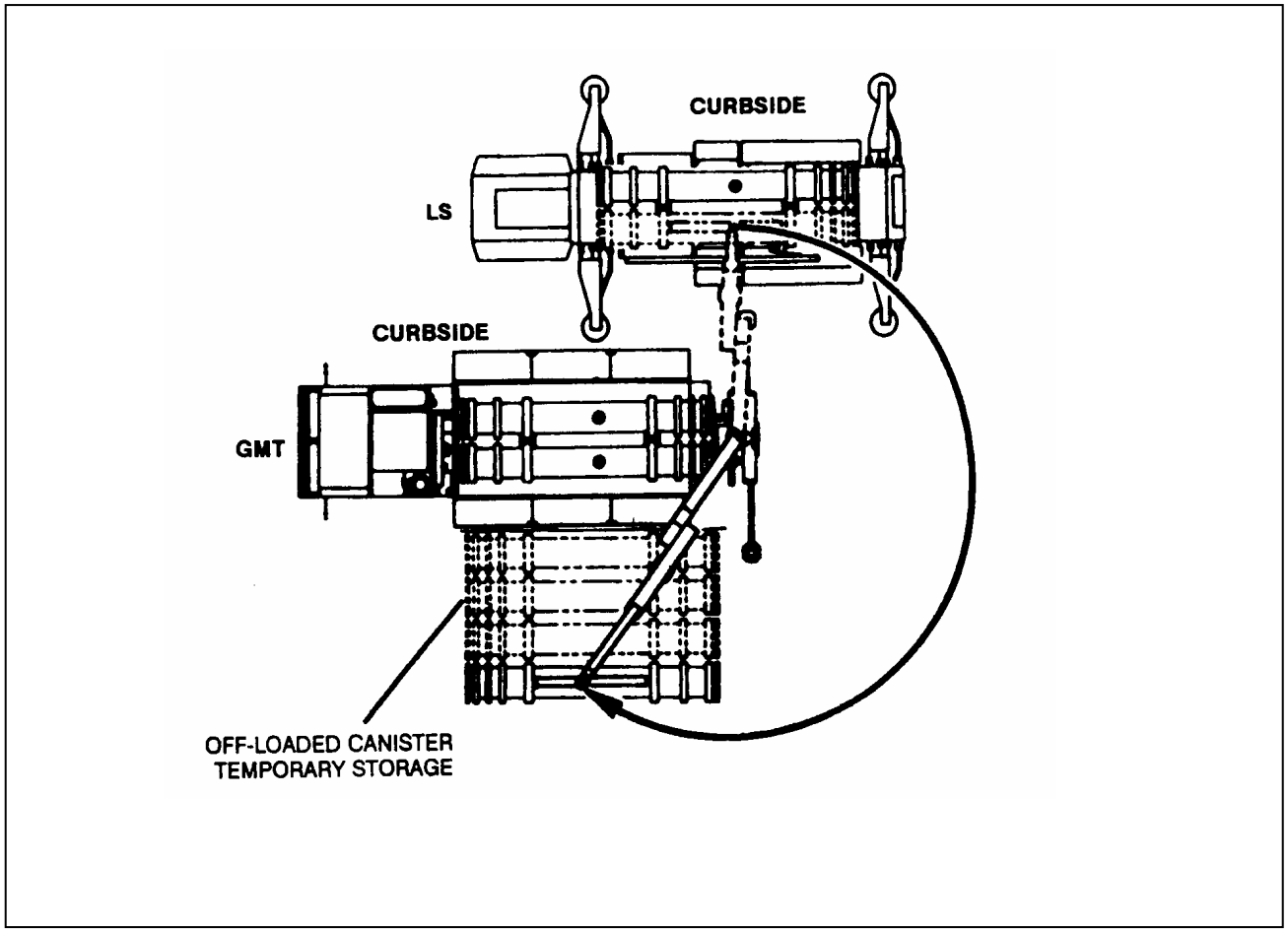


Figure 2-11. Parallel Reload LS/GMT (Empty Canister Positioning).

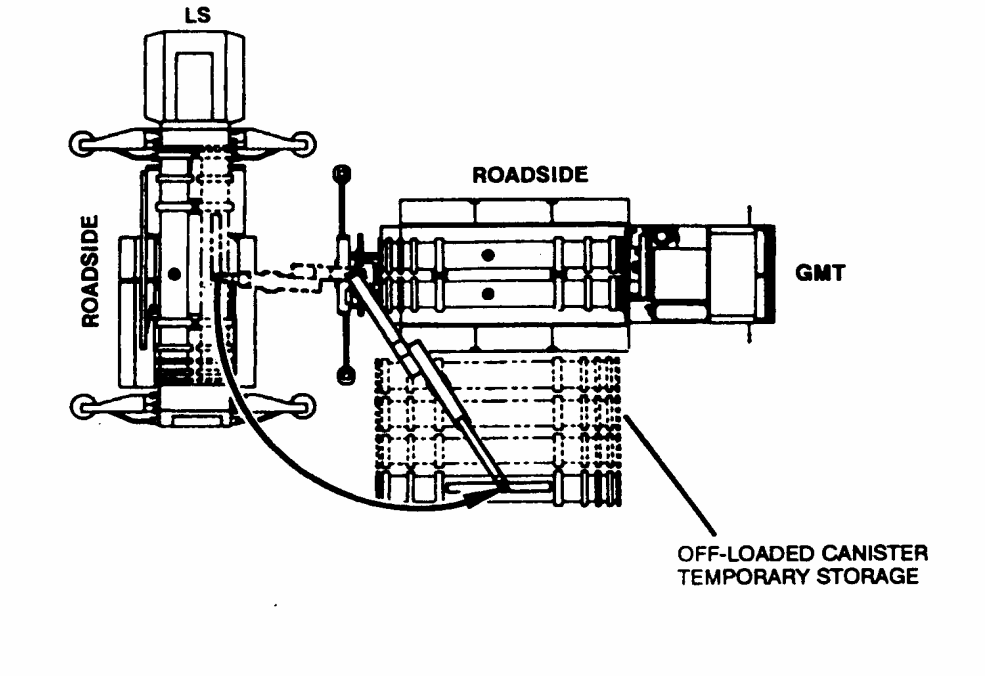


Figure 2-12. Perpendicular Reload LS/GMT (Empty Canister Positioning).

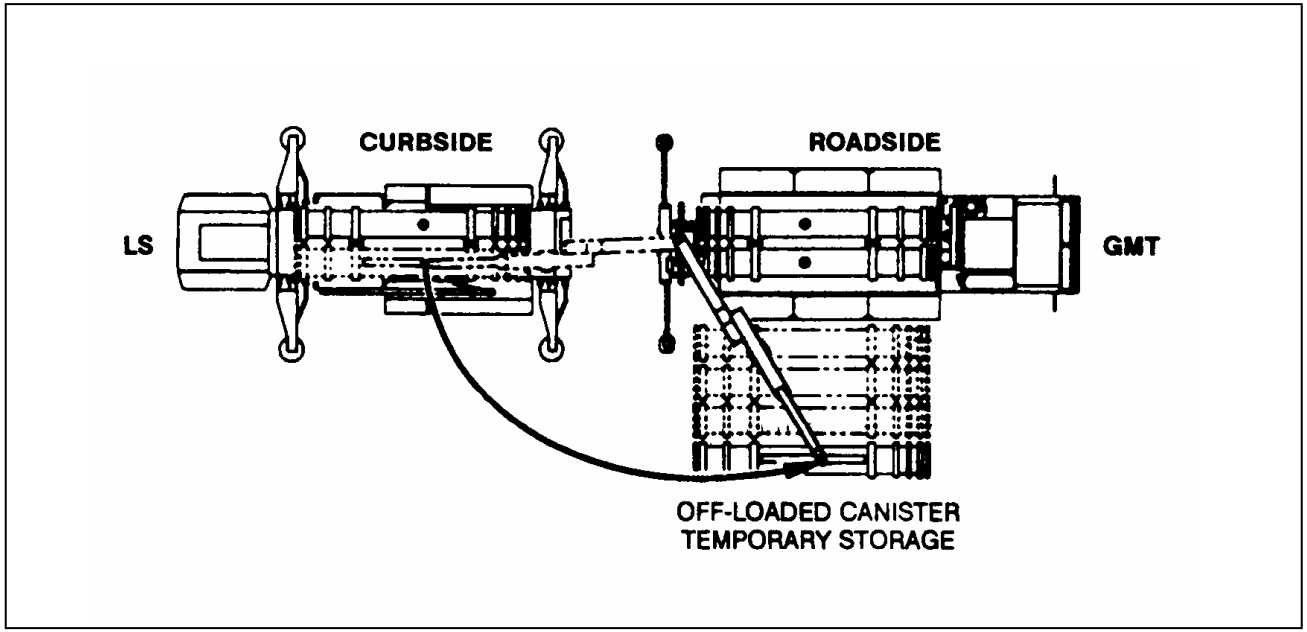


Figure 2-13. End-to-End Reload LS/GMT (Empty Canister Positioning).

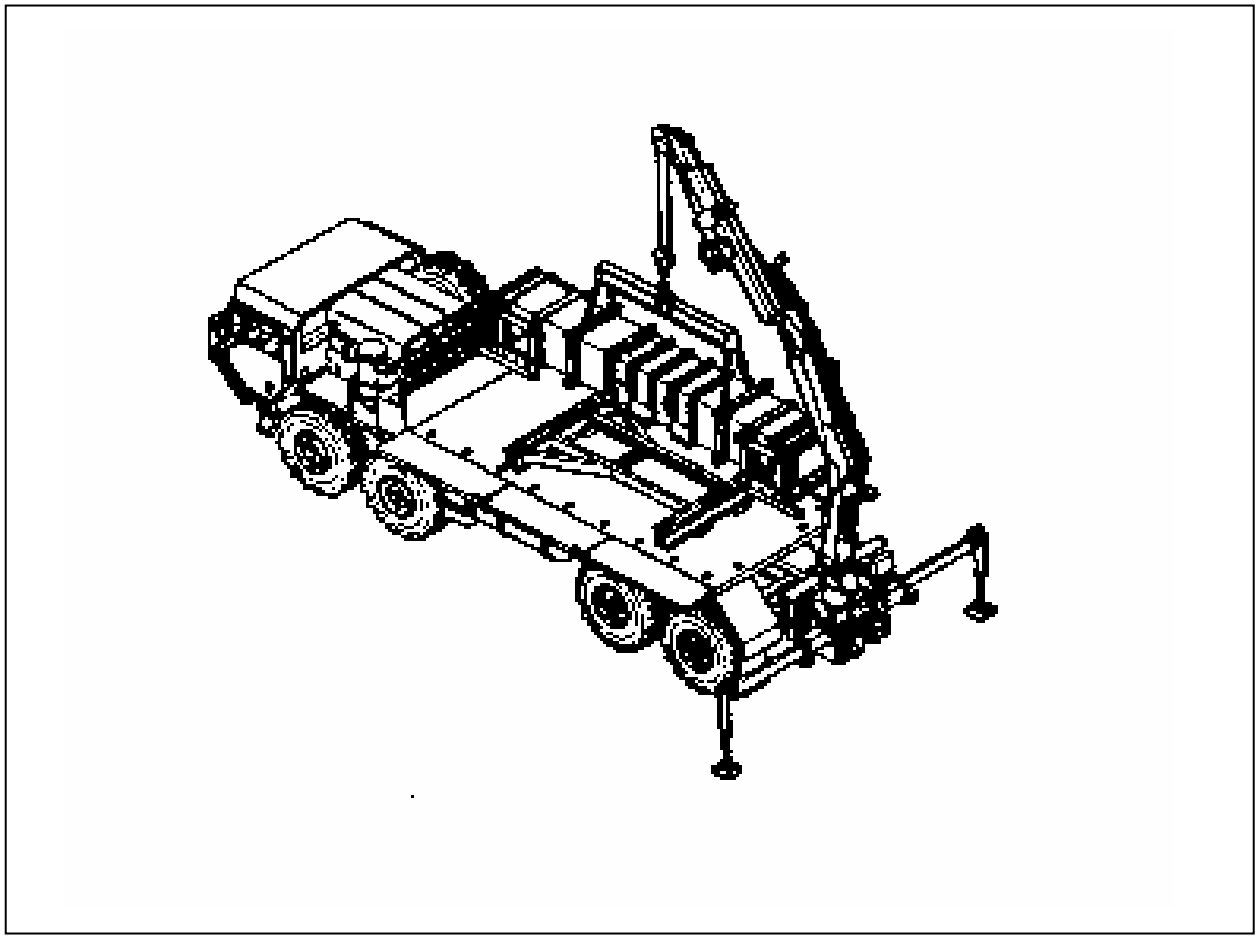


Figure 2-14. GMT in Action.

WARNING
Stay clear of launcher mechanics plane of rotation until LOCAL-RMT switch is set to LOCAL, LOCAL light is on, and key is removed. If LOCAL-RMT switch is not set to LOCAL, the LS can be rotated remotely, causing injury to personnel.

CAUTION
A damaged canister can indicate an unusable missile. Report any canister damage immediately. Unit commander will decide if missile is to be replaced or used.

Note: For centralized reload, LS march order procedures and LS emplacement procedures must be completed according to appropriate drill procedures. Steps 1 through 6 of the following missile reload procedures will have been completed during LS march order; CMs 1 and 2 begin missile reload procedure with step 7. For decentralized reload, CMs 1 and 2 must perform steps 1 through 7 before GMT reload team arrives, and if time permits, perform applicable missile cable check following step 8 (refer to Appendixes I, L, and M).

CREW MEMBER 1	CREW MEMBER 2
1. Assists CM 2.	1. Prepares LS for reload.
	a. Opens A1 LEM/ELES doors.
Note: For evaluation purposes, time starts when LOCAL/RMT switch is set to LOCAL.	Note: For evaluation purposes, time starts when LOCAL/RMT switch is set to LOCAL.
b. Verifies CM 2 has placed LS to LOCAL.	b. Sets LOCAL/RMT switch to LOCAL.
	c. Verifies the LOCAL light comes on.
	d. Sets launch ENABLE/DISABLE to DISABLE.
	e. Removes key from LOCAL/RMT switch.

CREW MEMBER 1	CREW MEMBER 2
2. Assists as needed.	2. Electrically rotates launcher mechanics platform. a. On LCU display panel, checks that the PLATFORM RAISED light is on. b. Sets ENGAGEMENT CONTROL handle to ROTATE. c. On LCU display panel, verifies the AZIMUTH READY light is on. Note: If PAC-3 launcher, go to step 2.e. d. Holds CCW/STOP/CW switch to CCW or CW to align 180-degree position pointer with alignment mark. Goes to step 3. e. On the main menu, selects LS SETUP. f. On the LS SETUP menu, selects MOVE PLTFRM. g. On the MOVE PLTFRM menu, selects ROTATE AZMTH. h. On the ROTATE AZMTH menu, selects STOW AZMTH to align 180-degree position pointer with alignment mark. i. Presses MENU three times to return to MAIN MENU. Note: Omit step 3 if there are no live GMs or if PAC-3 rounds are on LS. Lock GMs in following order: UR, LR, UL, and LL.
3. Locks GM torque tube handle on each live canister as follows: a. Removes quick-release pin, pulls out plunger, rotates torque tube handle to lock position, releases plunger, and ensures plunger seats in detent hole to secure torque tube handle.	3. Assists CM 1 as required.

CREW MEMBER 1	CREW MEMBER 2
b. Ensures that no red paint shows to the left of torque tube handle and inserts quick-release pin.	
c. Verifies with CM 2 that MISSILE READY light is off.	c. Observes MISSILE READY light on LCU display panel. Lights should go out as GM torque tube handles are placed in locked position.
d. Repeats step 3 for each live GM.	d. Repeats step 3 for each live GM.
	e. Electrically disconnects missiles.
4. Assists CM 2 as needed.	4. Electrically lowers launcher mechanics platform.
	a. Sets ENGAGEMENT CONTROL handle to ELEV.
	Note: If PAC-3 launcher, go to step 4f.
	b. On LCU display panel, checks AZIMUTH READY light is off.
CAUTION Before lowering LS platform, ensure the guardrail is <u>not</u> installed around the generator set unless guardrail has been modified. Equipment damage may result.	
	c. Sets RAISE/STOP/LWR switch to LWR. Momentarily holds the START switch to UP. Platform will lower to steady rest and stop.
	d. Checks PLATFORM RAISED light is off. Sets the RAISE/STOP/LWR switch to STOP.
	e. Sets ENGAGEMENT CONTROL handle to ROAD MARCH, if road march is to be performed.

CREW MEMBER 1	CREW MEMBER 2
	f. Lowers launcher platform. (1) At the ELES-LCU, verifies the AZIMUTH READY light is off. (2) From CDP MAIN MENU, selects LS SETUP. (3) From LS SETUP, selects MOVE PLATFORM. (4) From PLTFRM MENU, selects LOWER PLATFORM. (5) From PLATFORM MENU, selects START. (6) Observes PLATFORM MOVING is displayed then PLTFRM LOWRD when platform reaches the steady rest position. (7) Verifies PLATFORM PLTRM RAISED light goes out, selects MENU, and returns CDP to MAIN MENU.
5. Powers down LS. a. At LEM/ELES, opens doors and verifies all MISSILE HAZARD lights are off.	5. Powers down LS. a. At DTLM, removes padlock and opens doors.
WARNING Radio access cover is heavy. To avoid injury when open, ensure cover is locked. Close cover carefully.	
b. At LEM or ELES, verifies CONNECT-DISC has been set to disconnect.	b. At AN/VRC-90A (ICOM), sets FCTN to STBY and CB1 to OFF.
c. Powers down LEM or ELES-PDU per march order procedures. Closes door(s).	

CREW MEMBER 1	CREW MEMBER 2
	d. Powers down DLTM-PDU per march order procedures. Closes DLTM doors.
e. Stows data link mast assembly.	e. Assists as needed.
f. At LEM-PCP, sets MAIN POWER-AC CB1 to OFF.	f. Removes guardrails around generator curbside.
g. Powers down generator set.	
h. Installs travel lock pins.	

WARNING

While on the LS, crew members must watch for and warn each other of unsafe conditions that can cause injury.

CAUTION

Handle antenna carefully to prevent damage.

Note: For centralized missile reload, begin with step 6.	Note: For centralized missile reload, begin with step 6.
6. Disconnects guided missile cables and stows per TM 9-1440-600-10 or TM 9-1440-1660-10.	6. Assists CM 1 as needed.

DANGER

To eliminate static charge, connect shorting plug to J1 of each live GM immediately after cable is disconnected. Static charges may explode ordnance devices, causing severe injury or death

Note: The remaining steps require five crew members to perform missile reload. The GMT position to the LS may be dictated by physical conditions of the terrain area around the LS. Several configurations with minimum and maximum measurements for positions are shown in Appendix F of this drill book. All measurements are from the edge of the LS frame. Do not measure from over-hanging platforms. Make measurements at three points: one from each end of the LS, and one about the center.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
7. Establishes GMT location markers per selected configuration (refer to Appendix F). Note: Perform appropriate checks (Appendix H, or Appendixes L and M) on platform after GMs are loaded and secured.	7. Assists CM 1 establish GMT location markers (refer to Appendix F).	7. Assists CMs 1 and 2 as needed.		
8. Assists CMs.	8. Assists CMs.	8. Positions GMT. a. Informs CMs 4 and 5 where to position GMT. b. At front roadside corner of GMT, signals and guides CM 5 into position. Notifies CM 5 when properly positioned. c. Verifies GMT is properly positioned.	8. Positions GMT. a. Coordinates position of GMT with CM 3. b. Assists CMs with positioning of GMT.	8. Positions GMT. a. Coordinates position of GMT with CM 3. b. When signaled by CM 3, drives GMT into position.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			d. Chocks vehicle and signals CM 5 to exit cab.	d. Places PTO switch to ON. Verifies that PTO light is on. e. When notified by CM 4 wheels are chocked, exits cab.
		f. Receives one end of GMT ground cable from CM 5. Connects to LS ground connector.	f. Removes ladder from stow position and places by curbside rear GMT cab.	f. Takes one end of ground cable from GMT platform and hands to CM 3.

WARNING

Be careful when lowering walkways from stowed position. If GMT is on a slope, walkways may slide off hinge pins and cause injury to personnel and/or damage to equipment.

9. Lowers GMT walkways	9. Lowers GMT walkways	9. Lowers GMT walkways.	9. Lowers GMT walkways.	9. Lowers GMT walkways.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

WARNING

<u>Both</u> canisters must be empty to lift a two-stack. Hoisting equipment and canister tie-downs will <u>not</u> stand the weight if one canister is loaded.

Note: For one canister off-load, perform step 10; for two-stack off-load, perform step 11.

10. Prepares canister on LS for off-load.	10. Prepares canister on LS for off-load.	10. Supervises deployment of GMT outriggers and canister preparation.	10. Deploys GMT outriggers.	10. Deploys GMT outriggers.
	Note: If live PAC-2 GMs are to be off-loaded from GMT, ensure torque tube handle is in LOCK position, quick-release pin is installed right side of torque tube handle, and no red paint shows left of torque tube handle.	Note: If live PAC-2 GMs are to be off-loaded from GMT, ensure torque tube handle is in LOCK position, no red paint shows left of torque tube handle, and quick-release pin is installed right side of torque tube handle.	Note: When hydraulic selector valve is in MANUAL position, all crane functions are controlled by manual controls at rear of GMT.	
a. Verifies all canisters are empty.	a. Assists CM 1.			

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
b. Using a ½-inch drive ratchet head, 30 to 150 foot-pounds torque wrench, 30/36-inch extension, loosens the four canister tie-down bolts on the canister to be off-loaded.	b. Assists CM 1.			
c. Removes quick-release pin, rotates tie-down bolt to raised position, and installs quick-release pin.	c. Assists CM 1.			
d. Removes ground cables from all empty GMCs.				

WARNING

Support cylinder while removing cylinder lock pin. Cylinder can fall and cause personal injury.

Note: Crane controls can vary speed of crane movement. Slight movement of control lever will cause crane to move slowly. Moving control lever to its full travel makes crane move faster.

11. Prepares LS canisters for two-stack off-load.	11. Prepares LS canisters for two-stack off-load.	11. Supervises deployment of GMT outriggers and canister preparation.	11. Deploys GMT outriggers.	11. Deploys GMT outriggers.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

Note: For GMT and LS side-by-side or perpendicular positions on level ground, off-load two-stack closest to GMT first. For GMT and LS in end-to-end position on level ground, off-load two-stack on side toward off-loaded canister temporary storage area first. For GMT and LS positions on sloped ground, off-load two-stack on down slope side first.

	Note: If live PAC-2 GMs are to be off-loaded from GMT, ensure torque tube handle is in LOCK position, quick-release pin is installed right side of torque tube handle, and no red paint shows left of torque tube handle.	Note: If live PAC-2 GMs are to be off-loaded from GMT, ensure torque tube handle is in LOCK position, quick-release pin is installed right side of torque tube handle, and no red paint shows left of torque tube handle.	Note: When hydraulic selector valve is in MANUAL position, all crane functions are controlled by manual controls at rear of GMT.	

WARNING

Support cylinder while removing cylinder lock pin. Cylinder can fall and cause personal injury.

a. Verifies all canisters on LS are empty.	a. Assists CM 1.	a. Supervises operations.		
b. Using a ½-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and ¾-inch deep socket, checks torque on all four upper canister tie-down bolts as follows:	b. Assists CM 1.			

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
(1) Sets the torque wrench handle micrometer for 60 foot-pounds of torque. (2) Climbs up on upper canisters and tightens the four upper (two on each canister) inside tie-down bolts until the torque wrench handle clicks off at 60 foot-pounds. (3) Using 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench, and 30- or 36-inch extension, loosens the four canister tie-down bolts at the bottom of the two-stack that is to be off-loaded. (4) Removes quick-release pins and rotates the tie-down bolts to the raised position and installs quick-release pins.				

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

(5) Removes ground cables from empty canisters.

WARNING
Do <u>not</u> raise tires off ground with outriggers. Equipment damage may result.

Note: Crane controls can vary speed of crane movement. Slight movement of control lever will cause crane to move slowly. Moving control lever to its full travel makes the crane move faster.

WARNING
Support cylinder while removing cylinder lock and pin. Cylinder can fall and cause injury to personnel.

12. Assists as needed.	12. Prepares canister sling for use.	12. Supervises unfolding of crane and preparation of sling.	12. Unfolds crane and prepares crane for operation.	12. Unfolds crane and prepares crane for operation.
a. Assists CM 2 with canister sling.	a. Releases the two canister sling tie-down straps.	a. Supervises operation.	a. Prior to operation of crane, crane operator makes a visual serviceability inspection for hydraulic leaks and cracked lines.	a. Prior to operation of crane, crane operator makes a visual serviceability inspection for hydraulic leaks and cracked lines.

DANGER

Keep boom clear of <u>all</u> electrical lines and other obstacles while operating crane. Death, personal injury, and/or equipment damage may result from contact with electrical line or other obstacles.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

DANGER

Crane operator should select an operating position where load will <u>not</u> pass overhead. Death or personal injury can

DANGER

Crane operator must swing boom slowly enough to have complete control of the load. Otherwise, death, personal injury, and/or equipment damage can result.

DANGER

Signals to crane operator must be given by one designated CM who must always be visible to crane operator. If crane operator loses sight of signaling CM, crane motion must be stopped <u>immediately</u>. Otherwise, death, personal injury,

	b. Slides canister sling out from its stowed position far enough to connect hoist hook to hoisting shackle.	b. Supervises operation.	b. Removes the retainer lock and boom stowage pin.	
		c. Supervises operation.	c. Signals CM 5 to raise outer boom off its rest.	c. Upon signal from CM 4, moves the outer boom control lever upward slowly until the outer boom rises off its rest.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
		d. Supervises operation.	d. Signals CM 5 to raise inner boom to approximately a 45-degree angle to the ground.	d. Upon signal from CM 4, moves inner boom control lever upward slowly until inner boom is approximately at a 45-degree angle to the ground.
		e. Supervises operation.	e. Signals CM 5; unfolds outer boom, watching as the boom extension sheave clears the outriggers.	e. Upon signal from CM 4, moves the outer boom control lever upward slowly; watching to ensure the boom extension sheave clears the outriggers, as the outer boom is unfolded.
		f. Supervises operation.	f. Signals CM 5 to lower inner boom until snatch block can be reached from ground level.	f. Upon signal from CM 4, moves inner boom control lever downward slowly until the snatch block can be reached from ground level.
g. Assists CM 4 with hoist hook.	.	g. Supervises operation.	g. Signals CM 5 to operate hoist control until the cable is slack enough to release hoist hook.	g. Upon signal from CM 4, moves the hoist control lever downward slowly until cable is slack enough to release hoist hook.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
	h. Removes hoist hook from travel hoop.	h. Supervises operation and assists CM 2 with hoist hook, if needed.		
			i. Signals CM 5 to raise inner boom.	i. Upon signal from CM 4, moves inner boom control lever upward slowly to raise the boom.
Note: Exercise crane and inspect cable per TM 9-2320-355-10. Skip step 13 if remote control is not needed.				
13. Stands by.	13. Stands by.	13. Supervises remote control setup, if used.	13. Prepares crane for remote control operations, if needed.	13. Prepares crane for remote control operations, if needed.
Note: The GMT outriggers must be deployed and crane unfolded prior to remote control setup.				
				a. Moves the hydraulic selector valve to the REMOTE position.
			b. Assists CM 5 with remote control and cable.	b. Removes the remote control and cable from the stowage compartment and connects the cable to the remote control.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			c. Assists CM 5.	c. Disconnects the front remote plug and connects the portable remote control plug to the electrical box. d. Pushes the REMOTE switch up to REMOTE position. e. To set engine high idle, moves engine SPEED CONTROL switch to ON. Momentarily moves the ENGAGE switch up. f. Turn POWER switch on the portable remote control to the ON position.
			g. Assists CM 5.	g. Checks operation of remote control.

Note: The crane controls have a variable speed capability. Moving a lever slightly will cause slow movement of the crane function. Moving the lever to its full travel will cause the crane function to move faster.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

WARNING

The crane operator should swing the boom slowly enough to have complete control over it. Otherwise, personal injury or equipment damage may result.

Note: For emergency shutdown of the crane function, push the REMOTE CONTROL switch in. This will stop all oil flow to the crane function. If the operator must leave the remote control unattended, place the Remote control power SWITCH TO OFF.

(1) Moves the SWING CONTROL switch back to swing the boom CW and moves the switch forward to move the boom CCW.

(2) Moves the INNER BOOM CONTROL switch forward to lower the inner boom and moves the switch back to raise the inner boom.

(3) Moves the OUTER BOOM CONTROL switch back to raise the outer boom and moves the switch forward to lower the outer boom.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

WARNING

Whenever extending the boom, push the hoist control lever down to allow space between the boom extension sheave at the end of the boom and the snatch block to prevent cable or sheave damage.

				(4) Moves the HOIST CONTROL switch forward to lower the hoist hook. At the same time, moves the BOOM EXTENSION switch forward to extend the boom. (5) Moves the BOOM EXTENSION CONTROL switch back to retract the boom. At the same time, moves the HOIST CONTROL switch back to reel in cable.
14. Assists CM 2 with sling.	14. Prepares to connect sling to crane hoist hook.	14. Supervises operation. a. Supervises operation.	14. Stands by. a. Signals CM 5 to center crane hoist hook over sling on GMT.	14. Stands by. a. Operates crane.

WARNING

Be very careful when lowering the hook. Swinging hook may cause injury to personnel or damage to equipment.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
	b. Connects hoist hook to canister sling hoisting shackle.	b. Verifies shackle is in the EMPTY position.		
		c. Perform PMCS on beam per Appendix J.		
d. Connects tag lines to sling.	d. Connects tag lines to sling.			
e. Dismounts GMT.	e. Dismounts GMT.			

WARNING

Stay clear of boom and sling when they are in motion. To prevent injury, do <u>not</u> get your hands caught <u>between</u> sling and canister. Crew members on LS <u>must</u> be watched by other crew members and warned of unsafe conditions to prevent injury.

f. Mans tag line.	f. Mans tag line.	f. Supervises.	f. Signals CM 5 to move sling and center it on the canister(s) to be moved first.	f. Operates crane.

Notes:

- If LS is empty, continue with step 17. (No empty are canisters to be off-loaded).
- If the two-stack off-load option is to be performed, go to step 16.
- The following step is for single canister off-load procedure.

15. Assists with off-load procedures as required.	15. Assists with off-load procedures as required.	15. Supervises and assists with off-load procedures.	15. Off-loads canisters from LS, one by one.	15. Off-loads canisters from LS, one by one.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
a. Releases tag line when directed by CM 3.	a. Releases tag line when directed by CM 3.	a. Notifies CMs 1 and 2 to release tag lines. b. With canister supporting weight of sling, connects four sling hoist hooks to four canister-hoisting rings. Ensures sling anchor shackles, hoist hooks, and canister-hoisting rings are not kinked or twisted.		

WARNING

When handling empty canisters, sling-hoisting shackle must be in the EMPTY position. When handling canister containing either a GM or ballast, sling-hoisting shackle must be in LOADED position. EMPTY PAC-3 canister must be handled in the EMPTY position. Otherwise, sling will tilt and may injure nearby soldiers.

		c. Verifies that sling-hoisting shackle is in correct position for canister to be moved.	c. Assists CM 3 as required.	

DANGER

Do not stand under or in the path of hoisted load. Serious injury or death may result if struck by moving load.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
d. Dismounts LS platform and mans tag line.	d. Dismounts LS platform and mans tag line.	d. Verifies tag lines are tended and all CMs are clear of canister to be moved.	d. Signals CM 5 to take a strain on load.	d. Operates crane.
e. Mans tag line.	e. Mans tag line.	e. Checks hoist hook and chains for kinks.		
Note: Place off-loaded canisters as far as possible from GMT so they are not in the path of live GM's travel, from GMT to LS.				
f. Mans tag line.	f. Mans tag line.	f. Verifies ground has been disconnected. g. Verifies that pathway from LS to off-loaded canister temporary storage area is clear. h. Notifies CM 4 when to proceed.	h. Signals CM 5 to slowly raise canister enough to clear alignment pins or obstructions as needed. (1) LS and GMT perpendicular; route canister from LS to temporary storage area by most direct path.	

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			(2) LS and GMT end-to-end and LS and GMT side by side; route canister from LS to temporary storage area by most direct path.	

CAUTION
Do not stack off-loaded canisters on top of each other.

i. When canister is on the ground, releases tag line.	i. When canister is on the ground, releases tag line.		i. Signals CM 5 to lower canister carefully to the ground.	i. Operates crane.
j. Goes to LS.	j. Assists CM 1.	j. With canister supporting sling weight, disconnects four sling hoist hooks from canister hoisting rings.	j. Signals CM 5 to lower sling to relieve load.	j. Operates crane.
k. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens the four-canister tie-down bolts on canister to be off-loaded.	k. Assists CM 1.	k. Verifies hoisting rings are flat against canister and removes tag lines from canister. Attaches tag lines to shackle at each end of sling.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
l. Removes quick-release pin, rotates tie-down bolt to raised position, and installs quick-release pin.	l. Assists CM 1.	l. Checks that hoisting shackle on sling is in EMPTY position. If necessary, changes shackle position.		
m. Dismounts LS and mans tag line.	m. Dismounts LS and mans tag line.	m. Inspects each of the eight alignment pins for defects, cracks, bends or distortion. If any faults are found, notifies maintenance officer.		

Note: Repeat off-load procedures steps 15e though m, for each remaining canister. At the completion of single canister off-load procedure, center sling over the first live GM to be uploaded onto LS.

16. Assists with off-load procedures as required.	16. Assists with off-load procedures as required.	16. Supervises and assists with off-load procedures.	16. Off-loads two-stack from LS.	16. Off-loads two-stack from LS.

Notes:

- For GMT and LS side-by-side or perpendicular positions on level ground, off-load two-stack closest to GMT first.
- For GMT and LS in end-to-end position on level ground, off-load two-stack on side toward off-loaded canister temporary storage area first.
- For GMT and LS positions on sloped ground, off-load two-stack on down slope side first.

a. Mans tag line.	a. Mans tag line.	
b. Releases tag line when directed by CM 3.	b. Releases tag line when directed by CM 3.	b. Notifies CMs 1 and 2 to release tag lines.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
		c. With crane supporting weight of sling, connects four sling hoist hooks to four canister-hoisting rings. Ensures sling anchor shackles, hoist hooks, and canister-hoisting rings are not kinked or twisted.		

WARNING

When handling empty canisters, sling-hoisting shackle must be in EMPTY position. EMPTY PAC-E canister must be in the EMPTY position. Otherwise, sling will tilt and may injure nearby crew members.

		d. Ensures hoisting shackle on canister sling is in proper position.	d. Assists CM 3 as required.	d. Assists CM 3 as required.
e. Climbs on forward LS platform and takes tag line from CM 3. Connects to bottom anchor shackle on canister.	e. Climbs on LS rear platform and takes tag line from CM 3. Connects to bottom anchor shackle on canister.	e. Removes tag lines from sling and hands to CMs 1 and 2.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
f. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens the two front tie-down bolts on two-stack with sling attached.	f. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens the two rear tie-down bolts on two-stack with sling attached.	f. Supervises operations.	f. Assists as needed.	f. Assists as needed.
g. Removes quick-release pin, rotates tie-down bolt to raised position, and installs quick-release pin.	g. Removes quick-release pin, rotates tie-down bolt to raised position, and installs quick-release pin.	g. Verifies that all grounds on empty canisters are removed.		
DANGER **Do <u>not</u> stand under or in path of hoisted-load. Serious injury or death may result if struck by moving load. Use extreme care when handling a two-stack in high or gusty wind. Use two people on each tag line when wind is high or gusty. Keep tag lines tight at all times when moving suspended load. Keep excess line under control to prevent tripping or catching tag line on obstacles. Serious injury may result if tag lines and suspended loads are not closely controlled.**				
h. Dismounts LS platform and mans tag line.	h. Dismounts LS platform and mans tag line.	h. Verifies tag lines are tended and all CMs are clear of two-stack to be moved.	h. Signals CM 5 to take a strain on load.	h. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
i. Mans tag line.	i. Mans tag line.	i. Verifies chains and hoist hooks are securely attached to load. Checks hoist hook and chains for kinks.		

WARNING

Ground where two-stack is to be placed must be clear; otherwise, two-stack may be unstable and fall over. When setting a two-stack on a slope, make sure it points in an uphill and downhill direction; otherwise, it may fall over.

Note: Examine the site before off-loading to determine where to place two-stacks. Place off-loaded two-stacks well away from path the GMs must follow when moved from GMT to LS. Two-stack will be about 6.5 feet (2.0 meters) high.

j. Using tag line, assists in guiding canister to temporary storage area.	j. Using tag line, assists in guiding canister to temporary storage area.	j. Notifies CM 4 when to proceed.	j. When signaled by CM 3 that area is clear, signals CM 5 to raise canister. Moves it slowly to area selected for off-loaded two-stack, per steps below. (1) LS and GMT side-by-side, routes two-stack around end of GMT. (Do not cross over live GMs.)	j. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			(2) LS and GMT perpendicular, routes two-stack from LS to temporary storage area by most direct path. (3) LS and GMT end-to-end, routes two-stack from LS to temporary storage area by most direct path.	

WARNING

Do <u>not</u> climb up on a two-stack unless it is firmly seated on the ground and is stable. Push it; if it rocks, move it. Wear work gloves when on a two-stack. Be sure of firm footholds and hand holds at all times.

k. Keeps tension on tag line for positive control of load.	k. Keeps tension on tag line for positive control of load.	k. Supervises off-loading.	k. Signals CM 5 to lower two-stack carefully to ground.	k. Operates crane.
l. Releases tag line when directed by CM 3.	l. Releases tag line when directed by CM 3	l. Verifies that two-stack is stable on ground and notifies CMs 1 and 2 to release tag line.	l. Signals CM 5 to lower sling to relieve load.	l. Operates crane.
m. Removes tag line from two-stack.	m. Removes tag line from two-stack.	m. Climbs onto two-stack and disconnects the four hoisting shackles and ensures sling hoist hook is in proper position.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
n. Gives tag line to CM 3.	n. Gives tag line to CM 3.	n. Connects tag lines to sling.		
o. Mans tag line.	o. Mans tag line.	o. Supervises and observes for safety.	o. Moves sling back toward LS.	o. Moves sling back toward LS.
		p. Inspects each of the eight alignment pins for defects, cracks, bends, or distortion. If any faults are found, notifies maintenance officer.		

Note: Repeat two-stack off-load procedures, steps 16a and through 16p, for remaining two-stack. At completion of two-stack off-load procedure, center sling on first live canister to be uploaded onto LS. For evaluation purposes, time starts when CM 3 gives the command, "Untorque."

WARNING

Crew members on GMT must be watched by other crew members and warned of any unsafe conditions to prevent injury.

Notes:

- The following step is for loading live missile-rounds to the LS.
- Move GMCs in the following order for step 17: UL, UR, LL, and LR (as viewed from the rear of the GMT).

17. Goes to and climbs up on GMT.	17. Goes to and climbs up on GMT.	17. Climbs up on GMT and gives command to, "Untorque bolts." Supervises and assists.	17. Assists as needed.	17. Assists as needed.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
a. Using a ½-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and ¾-inch deep socket, loosens the four canister tie-down canister to be off-loaded as follows: (1) Removes quick-release pin from inner and outer canister bolts. (2) Loosens each tie-down bolt. (3) Rotates tie-down bolts to raised position. (4) Installs quick-release pins.	a. Using a ½-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and ¾-inch deep socket, loosens the four canister tie-down canister to be off-loaded as follows: (1) Removes quick-release pin from inner and outer canister bolts. (2) Loosens each tie-down bolt. (3) Rotates tie-down bolts to raised position. (4) Installs quick-release pins.	a. Connects crane hook to loaded position and connects four sling hoist hooks to four canister-hoisting rings.		
b. Connects tag lines to canister and climbs down from GMT.	b. Connects tag lines to canister and climbs down from GMT.	b. Disconnects tag lines from sling and gives to CM 1 and CM 2.		
c. Assists with movement of GM from GMT to LS as required.	c. Assists with movement of GM from GMT to LS as required.	c. Supervises.	c. Moves GM from GMT to LS.	c. Moves GM from GMT to LS.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
d. Mans tag line.	d. Mans tag line.	d. Supervises.	d. Signals CM 5 to put strain on load.	d. Operates crane.
e. Mans tag line.	e. Mans tag line.	e. Checks hoist hook and chains for kinks, and verifies tag lines are tended.		e. Operates crane.

WARNING

When handling loaded canisters, sling hoisting shackle must be in LOADED position; otherwise, sling will tilt and may injure nearby crew members.

f. Mans tag line.	f. Mans tag line.	f. Disconnects ground cable from GM and dismounts GMT.		f. Operates crane.
g. Mans tag line.	g. Mans tag line.		g. Signals CM 5 to slowly raise canister to clear alignment pins or obstructions as needed.	g. Operates crane.
h. Mans tag line.	h. Mans tag line.	h. Verifies pathway from GMT to LS is clear.		
i. Mans tag line.	i. Mans tag line.			

DANGER

Do not stand under or in the path of hoisted load. Serious injury or death may result if struck by moving load.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
j. Mans tag line.	j. Mans tag line.	j. Notifies CM 4 to proceed.	j. Signals CM 5 to raise GM and move it toward LS.	j. Operates crane.
Note: CMs 1 and 2 perform steps (1), (2), and (3) if it is necessary to rotate canisters.				
(1) Walks toward CM 2, but does not walk under canister.	(1) Walks toward CM 1, but does not walk under canister.			
(2) Exchanges tag line with CM 2.	(2) Exchanges tag line with CM 1.			
(3) Slowly walks back to previous position, rotating canister slowly (do not walk under hoisted load).	(3) Slowly walks back to previous position, rotating canister slowly (do not walk under hoisted load).			
		k. Verifies FORWARD arrow on canister is pointed toward front of LS.		k. Operates crane.
l. Mans tag line.	l. Mans tag line.	l. Notifies CM 4 to proceed.	l. When notified by CM 3, signals CM 5 to position GM over alignment pins on lower GM or LS as applicable.	l. Operates crane.
m. Mans tag line.	m. Mans tag line.	m. Supervises operation.	m. Signals CM 5 to lower canister until it is just above alignment pins.	m. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
n. Hands tag line to CM 3. Climbs on LS front platform and prepares to manually align canister with alignment pins.	n. Hands tag line to CM 4. Climbs on LS rear platform and prepares to manually align canister with alignment pins.	n. Takes tag line from CM 1 until manual control of canister is gained. Coils loose end and places loose end of tag line in safe place on LS.	n. Takes tag line from CM 2 until manual control of canister is gained. Coils loose end and places loose end of tag line in safe place on LS.	
o. As canister is lowered, manually aligns canister with alignment pins.	o. As canister is lowered, manually aligns canister with alignment pins.	o. Notifies CM 4 to proceed.	o. When notified by CM 3, signals CM 5 to slowly lower canister on to alignment pins.	
	p. Connects ground cables to GM as follows:		p. Signals CM 5 to lower sling onto canister above alignment pins.	p. Operates crane.

WARNING

Do <u>not</u> hold outside of canister skids when aligning GM with alignment pins. Your hands can be seriously injured if GM sways. On PAC-3 GMCs, hold on to inside of skids to prevent injury.

(1) For lower GMs—

(a) Removes ground cable from spring clip at applicable stowed position.

(b) Connects ground cable to GM.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
	(2) For upper GMs— (a) At applicable stowed positions, rotates screw on quick-disconnect loop clamp 1/4 turn ccw. (b) Opens clamp and removes ground cable from clamp. (c) Removes end of ground cable from spring clip. (d) Connects ground cable to GM.			
18. Secures GM to LS. a. Climbs up on LS platform, and disconnects tag line from GM and places on canister.	18. Secures GM to LS. a. Climbs up on LS platform and disconnects tag line from GM and places on canister.	18. Unhooks sling from canister. a. Disconnects four hoist hooks on sling from four hoisting rings on canister.	18. Prepares GM for removal from GMT. a. Goes to and climbs up on GMT.	18. Assists as needed. a. Assists as needed.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
b. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, torques the two front tie-down bolts as follows: (1) Moves quick-release pins from inner and outer canister tie-down bolts. (2) Rotates tie-down bolts to down position. (3) Ensures that torque wrench handle micrometer is set to 60 foot-pounds. (4) Using torque wrench, tightens each tie-down bolt until torque wrench clicks off. (5) Installs quick-release pins.	b. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, torques the two rear tie-down bolts as follows: (1) Moves quick-release pins from inner and outer canister tie-down bolts. (2) Rotates tie-down bolts to down position. (3) Ensures that torque wrench handle micrometer is set to 60 foot-pounds. (4) Using torque wrench, tightens each tie-down bolt until torque wrench clicks off. (5) Installs quick-release pins.	b. Places hoist rings flat against canister.	b. Using a 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens the four canister tie-down bolts on the canister to be off-loaded as follows: (1) Removes quick-release pin from inner and outer canister bolts. (2) Loosens each tie-down bolt. (3) Rotates tie-down bolts to raised position. (4) Installs quick-release pins.	b. Assists CM 4.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
c. Climbs down from LS. Mans tag line.	c. Climbs down from LS. Mans tag line.	c. Transfers sling-hoisting shackle to EMPTY position. d. Attaches one tag line to shackle on each end of sling and climbs down from LS. e. Notifies CM 4 to proceed.	c. Climbs down from GMT. e. Signals CM 5 to move sling away from LS.	c. Assists as needed. e. Operates crane.

Note: Repeat steps 17 and 18 until all four GMs are loaded and secured on LS. For evaluation purposes, time stops when all four GMs are loaded and secured on the LS and sling is placed on GMT platform. Perform step 19 below only if canisters off-loaded from LS are to be loaded onto the GMT; otherwise go to step 20.

WARNING

Stay clear of boom and sling when they are in motion. Do <u>not</u> get hands caught <u>between</u> sling and canister. Serious injury an result. Do <u>not</u> load an empty two-stack onto the GMT. Uncouple the two-stack if the empty canisters are to be loaded onto the GMT.

19. Assists with movement of empty canisters from ground to GMT as needed. a. If empty canisters were off-loaded as a two-stack, uncouples each two-stack as follows:	19. Assists with movement of empty canisters from ground to GMT as needed. a. If empty canisters were off-loaded as a two-stack, uncouples each two-stack as follows:	19. Supervises and assists in movement of empty canisters from ground to GMT. a. If empty canisters were off-loaded as a two-stack, uncouples each two-stack.	19. Loads off-loaded LS empty canisters onto GMT.	19. Loads off-loaded LS empty canisters onto GMT.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
(1) With 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens two inner upper canister tie-down bolts.	(1) With 1/2-inch drive ratchet head, 30 to 150 foot-pound torque wrench handle, 30/36-inch extension, and 3/4-inch deep socket, loosens two outer upper canister tie-down bolts.	(1) Supervises operation.		
(2) Removes quick-release pins, rotates tie-down bolts to raised position, and installs quick-release pins.	(2) Removes quick-release pins, rotates tie-down bolts to raised position, and installs quick-release pins.	(2) Supervises operation.		
(3) Mans tag line.	(3) Mans tag line.	(3) With crane supporting weight of sling, connects the four sling hoist hooks to four canister-hoisting rings. Verifies that sling anchor shackles, hoist hooks, and canister hoisting rings are not kinked or twisted.		
(4) Removes tag line from sling and connects to bottom anchor shackle on canister.	(4) Removes tag line from sling and connects to bottom anchor shackle on canister.	(4) Verifies sling-hoisting shackle is in correct position for canister to be moved.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
(5) Mans tag line.	(5) Mans tag line.	(5) Notifies CM 4 to proceed.	(5) When notified by CM 3, signals CM 5 to take a strain on load.	(5) Operates crane.
(6) Mans tag line.	(6) Mans tag line.	(6) Checks hoist hook and chains for kinks, and verifies tag lines are tended.	(6) Stands by.	(6) Operates crane.
(7) Mans tag line.	(7) Mans tag line.	(7) Notifies CM 4 to proceed.	(7) Signals CM 5 to raise canister and move it toward GMT.	(7) Operates crane.
(8) Mans tag line.	(8) Mans tag line.	(8) Verifies FORWARD arrow on canister is pointed toward front of GMT.	(8) At halfway point, signals CM 5 to stop if canisters need to be rotated.	(8) Operates crane.

Note: CMs 1 and 2 perform steps (a), (b), and (c) below if it is necessary to rotate canisters. If it is not necessary, continue to step b.

(a) Walks toward CM 2. (Do not walk under canister.)	(a) Walks toward CM 1. (Do not walk under canister.)
(b) Exchanges tag line with CM 2.	(b) Exchanges tag line with CM 1.
(c) Slowly walks back to previous position, rotating canister slowly. Do not walk under hoisted load.	(c) Slowly walks back to previous position, rotating canister slowly. Do not walk under hoisted load.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
b. Mans tag line.	b. Mans tag line.	b. Notifies CM 4 to proceed.	b. When notified by CM 3, signals CM 5 to position canister over alignment pins on lower canister or GMT, as applicable.	b. Operates crane.

WARNING

Do <u>not</u> hold on to the outside of canister skids when aligning canister with alignment pins. Your hands can be seriously injured if canister sways. On PAC-3 GMCs, hold on to inside of canister skids to prevent injury.

c. Mans tag line.	c. Mans tag line.	c. Supervises operation.	c. Signals CM 5 to lower canister until it is just above alignment pins.	c. Operates crane.
d. Hands tag line to CM 3. Climbs on forward GMT platform and prepares to manually align canister on alignment pins.	d. Hands tag line to CM 4. Climbs on GMT rear platform and prepares to manually align canister on alignment pins.	d. Takes tag line from CM 1 until manual control of canister is gained. Coils loose end and places on GMT platform.	d. Takes tag line from CM 2 until manual control is gained. Coils loose end and places on GMT platform.	
e. As canister is lowered, manually aligns canister with alignment pins.	e. As canister is lowered, manually aligns canister with alignment pins.	e. Notifies CM 4 to proceed.	e. When notified by CM 3, signals CM 5 to lower canister onto alignment pins.	e. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			f. Signals CM 5 to lower hook and relieve tension on load.	f. Operates crane.
g. Removes tag line from bottom anchor shackle and places on canister.	g. Removes tag line from bottom anchor shackle and places on canister.		g. Assists as needed.	g. Assists as needed.
	h. Assists if needed.	h. Disconnects four sling hooks from canister hoisting rings and connects one tag line to each end of sling.		
	i. Assists if needed	i. Places hoist rings flat against canister.		
Note: If loaded canister contains a live GM, perform step j below. If not, go to step k.				
		j. Connects GMT ground cable to canister connector.		
		k. Ensures that sling-hoisting shackle is in EMPTY position.		
l. Secures canister to GMT.	l. Assists CM 1.	l. Supervises operation.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
(1) Removes quick-release pin from the four canister tie-down bolts and flips tie-down bolts to down position. Installs quick-release pin.				
(2) Sets torque wrench handle to 60 foot-pounds.				
m. Using torque wrench, tightens four inner tie-down bolts until torque wrench clicks.	m. Assists CM 1.			
n. Disconnects tag line from canister and hands to CM 3.	n. Disconnects tag line from canister and hands to CM 3.	n. Connects tag line to sling.		
o. Climbs down from GMT, mans tag line.	o. Climbs down from GMT, mans tag line.	o. Notifies CM 4 to proceed.	o. Signals CM 5 to move sling away from GMT.	o. Operates crane.
Note: Repeat Step 19 for each canister to be loaded onto the GMT.				
20. Assists in stowing GMT equipment.	20. Assists in stowing GMT equipment.	20. Supervises operation.	20. Stows GMT equipment.	20. Stows GMT equipment.
a. Mans tag line.	a. Mans tag line.		a. Signals CM 5 to move canister sling to roadside walkway of GMT next to sling stowage area.	a. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

WARNING

Be very careful when raising hook. Swinging hook may cause injury to personnel or damage to equipment.

b. Assists CM 2.	b. Removes tag lines from sling and stows in GMT curbside stowage box.	b. Disconnects GMT ground cable from LS ground connector and installs protective cover on LS.		
c. Assists CM 2.	c. Slides canister sling into stowage area, under canisters, and between legs of H frame.		c. Stows GMT ground cable in GMT platform.	
d. Assists CM 2.	d. Secures sling in place with two straps.			
21. Performs applicable cable test.	21. Assists CM 1 as required.	21. Supervises and assists operations.	21. Assists CM 5 as required.	21. Removes and stows remote control unit if used.

Notes: Perform steps a through f for CMs 4 and 5 if remote control was used. Ensure LS is grounded before power-up procedures are performed. Perform all tests according to Appendixes I, L, M, and N according to launcher configuration and type. Perform PAC-2/PAC-3 canister test launch test per TM 9-1440-1600-10.

a. Powers generator set.				a. Sets POWER switch on remote control to OFF.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
b. At LEM/ELES - PCP, sets main AC to on.				b. Sets the REMOTE switch on the electrical control box to MANUAL.
	c. Powers up DLTM-PDU per emplacement procedure.			c. Disconnects the portable remote control cable plug from the front remote station.
d. Powers LEM/ELES per emplacement procedures. Note: If ELES is used, skip step e.				d. Installs protective caps on the front remote cable terminal.
e. Performs BITE test on PAC-2 LS.				e. Disconnects cable plug from the remote control. Places the remote control and coiled up cable in the stowage compartment. f. Moves the hydraulic selector valve to the MANUAL position.
22. Continues performing any canister safety checks that are not complete.	22. Assists CM 1 as required.	22. Supervises and assists.	22. Folds crane and locks boom in boom rest.	22. Folds crane and locks boom in boom rest.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			a. Signals CM 5 to move the boom extension control lever up to retract the boom.	a. Operates crane.
			b. Signals CM 5 to move the hoist control lever up to reel in excess cable.	b. Operates crane.
			c. Signals CM 5 to move the inner boom control lever up to lower the boom until the snatch block can be reached from ground level.	c. Operates crane.
			d. Attaches the hoist hook to the travel loop on the outer boom.	d. Operates crane.
			e. Signals CM 5 to move the hoist control lever up to reel in excess cable.	e. Operates crane.
			f. Signals CM 5 to move the inner boom control lever down to raise the inner boom until it is at an approximate 45-degree angle to the ground.	f. Operates crane.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			g. Signals CM 5 to move the outer boom control lever up to lower the outer boom all the way.	g. Operates crane.
			h. Signals CM 5 to move the swing control lever up or down to align the boom over the left outrigger beam.	h. Operates crane.
			i. Sets the ENGINE HIGH IDLE switch to OFF.	i. Operates crane.
			j. Signals CM 5 to move inner boom control lever up to lower the inner boom into the stowage bracket.	j. Operates crane.
			k. Installs the stowage pin through the stowage bracket and secures with retainer lock.	
			l. Signals CM 5 to move the outer boom control lever up to position the outer boom in the boom rest.	l. Operates crane.

23. Energizes LEM/ELES per TM 9-1440-600-10 or TM 9-1440-1600-10.	23. Assists CM 1 as required.	23. Assists as needed.	23. Stows GMT roadside outrigger.	23. Stows GMT curbside outrigger.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			a. Removes lock and pin securing pad to cylinder.	a. Removes lock and pin securing pad to cylinder.
			b. Turns cam handle valve pointer outward to retract position.	b. Turns cam handle valve pointer outward to retract position.
				c. Holds boom fold-down lever downward to cause both outrigger cylinders to retract. When cylinders are fully retracted, releases lever.
			d. Turns cam handle valve pointer to center (lock) position.	d. Turns cam handle valve pointer to center (lock) position.
			e. Installs outrigger pad in stowed position. Secures pad in place with pin and lock.	e. Installs outrigger pad in stowed position. Secures pad in place with pin and lock.
			f. Removes outrigger pad in stowed position. Secures pad in place with pin and lock.	f. Removes outrigger cylinder retainer lock and pin.
			g. Rotates outrigger	g. Rotates outrigger

cylinder forward to upright vertical position.	cylinder forward to upright vertical position.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5

WARNING

Support outrigger cylinder while installing cylinder pin and lock. Cylinder can fall and cause personal injury.

	h. Supports outrigger cylinder and installs cylinder pin and lock.	h. Supports outrigger cylinder and installs cylinder pin and lock.
	i. Removes outrigger beam retainer lock and pin.	i. Removes outrigger beam retainer lock and pin.
	j. Pushes in outrigger beam against stop.	j. Pushes in outrigger beam against stop

WARNING

To prevent injury, keep fingers from behind outriggers when pushing in beam. Fingers can be pinched between outrigger and other parts of vehicle.

	k. Installs outrigger beam retainer pin and lock.	k. Installs outrigger beam retainer pin and lock.

Note: This procedure is a two-person task. Any two of these GMT crew members on the ground beside the GMT may perform this task.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
		24. Supervises and assists in preparing GMT for travel.	24. Prepares GMT for travel.	24. Assists CM 4.

WARNING

Side panels may slide off hinge pins if GMT is parked on a grade. Falling panels can cause injury to personnel and damage to equipment.

		a. Installs walkway retention pins at forward and rear ends of walkway. Uses ladder if necessary.	a. On roadside of GMT, raises walkway to upright position.	a. Assists CM 4.
		b. Installs walkway retention pins at both ends of walkway. Uses ladder if necessary.	b. On curbside of GMT, raises walkway to upright position.	b. Assists CM 4.
		c. Stows ladders on LS and GMT, and secures.	c. On roadside of GMT, removes walkway support arm retention pins.	c. On curbside of GMT, removes walkway support arm retention pins.
		d. Supervises operation.	d. Swings walkway support arms against GMT in stowed position.	d. Swings walkway support arms against GMT in stowed position.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3	CREW MEMBER 4	CREW MEMBER 5
			e. Installs retention pins to secure walkway support arms in stowed position.	e. Installs retention pins to secure walkway support arms in stowed position.
			f. Enters cab of GMT.	f. Removes GMT chock blocks and stows in GMT curbside stowage box.
			g. Prepares to evacuate area.	g. Grounds guide GMT out of area.

Note: Procedures to be performed at this point depend on orders received. If LS is to rejoin firing platoon, crew members perform emplacement procedures per Crew Drill 44-5-D013 (PAC-3). If road march is to be performed, crew members perform march order procedures per Crew Drill 44-5-D014 or 44-5-D020 (PAC-3).

COACHING POINT: The performance measures are completed in the sequence outlined. All crew members do their like-numbered performance measures at the same time. When all the performance measures have been mastered and all crew members can do their jobs without coaching, go for speed and remember to be safety-conscious. The more the drill is performed, the better the crew members will perform together.

RUN-THROUGH INSTRUCTIONS: The crew members should practice this drill until they can perform the drill according to the standard without using the drill book. The initial run-through should be conducted slowly. The crew members should change positions in order to learn all steps and standards.

PERFORM: When the crew members can perform this crew drill to standards, inform the platoon sergeant or platoon leader that the crew members ate ready to be evaluated.

SUPPORTED T&EOs

ARTEP NUMBER	T&EO NUMBER	T&EO TASK TITLE
44-635-MTP	44-4-9027	Perform Missile Reload Operations
44-637-30-MTP	44-4-9027	Perform Missile Reload Operations

2-5. CREW DRILL 44-5-D019.

TASK: Emplace the PAC-3 LS for Tactical Operations (44-5-D019).

CONDITIONS: The battery is preparing to occupy a new position. The PAC-3 LS is in the march order configuration and a general location to emplace the LS has been selected. All components of the LS are available and operable. A crew has been assigned to emplace and prepare the system for tactical operations in all environmental and NBC conditions, both day and night. As the LS crew approaches the selected position, the LS ground guide orients and positions the LS to a designated spot and commands, "Halt vehicle."

STANDARDS: Emplace and prepare the PAC-3 LS for tactical operations by the performance measures as sequenced in this drill. Complete this drill within 25 minutes when in a training environment.

Notes:
- Allow additional emplacement time when fiber-optic cables are to be installed.
- The time required to perform this drill in MOPP 4 will increase per ARTEP 44-637-30-MTP, Figures 5-1 and 5-2.

SUPPORTING INDIVIDUAL TASKS: Supporting individual tasks for this drill are listed in Appendix A, Individual Task-to-Drill Matrix.

ILLUSTRATIONS: Figure 2-15.

SETUP INSTRUCTIONS: The following equipment, areas, and personnel must be provided for the drill to be trained correctly.

a. Resources. As a minimum, the following is required: One Patriot, semitrailer-mounted, guided missile launching station M902, with basic issue items.

b. Training site. The potential site must be large enough (10x20 meters) to prevent fires from hot exhaust. The site should be as level as possible. The maximum allowable slope from front to back or side to side is 10 degrees.

c. Unit instructions. The crew members will emplace and prepare the LS for tactical operations at a designated location using the following procedures:

(1) Before the launcher platoon arrives, the RSOP team will have decided the position of each LS and emplaced marker stakes and ground rods to show launcher vehicle positions.

(2) All launcher vehicles should arrive on site at approximately the same time and stop a short distance from the launcher emplacement sites.

(3) One crew member from each vehicle will serve as a ground guide to direct the driver to position the LS at the selected emplacement site.

TALK-THROUGH INSTRUCTIONS: The mission of the LS is to transport, store, support, aim, and fire missiles during normal air defense missions. The crew members must be able to emplace the LS and prepare it for tactical operations where directed within prescribed time limits.

a. Orientation. Before beginning drill training, ensure that each crew member knows the purpose of the drill and is briefed on safety awareness.

b. Safety/Fratricide. All soldiers that operate the LS must know that safety hazards exist while operating the various items of equipment. These hazards can and have caused severe injuries to operators. Be extremely careful when working around the LS. Throughout the crew drill, observe all dangers, warnings, and cautions required to properly emplace the LS. All commanders, trainers, and leaders must plan, train, and stress all procedures that must be followed to avoid fratricide. These procedures include IFF, weapon control status, vehicle and aircraft recognition, corridors, routes, zones, flight levels, and other control measures. Munitions cannot distinguish between friend or foe.

c. Demonstration (optional). If a nearby crew has successfully performed the drill, have that crew demonstrate the drill. Explain what is being done and why, using the performance measures as a guide. After the demonstration, summarize.

d. Explanation. Explain the drill in the following manner:

(1) Using a diagram, Figure 2-15, a sand table, or a simple sketch in the dirt, show the crew members how the LS should be emplaced.

(2) Tell the crew members what their duties are in the drill.

(3) Read the performance measures of the drill to the crew members.

(4) Have crew members explain their performance measures to ensure that they understand them.

WALK-THROUGH INSTRUCTIONS:

a. Have crew members take their positions and perform the drill. Use the crawl-walk-run method of training. Start the training slowly. Correct any mistakes the crew members make as they go; do not proceed until drill procedures are performed correctly. After the crew members demonstrate their proficiency at a slow pace, let them do it faster. Remember, however, that safety is never sacrificed for speed. Watch carefully to make sure the crew members achieve all of the standards for the drill.

b. Initiating Cue. The LS ground guide orients and positions the LS to a designated spot and commands, “Halt vehicle.”

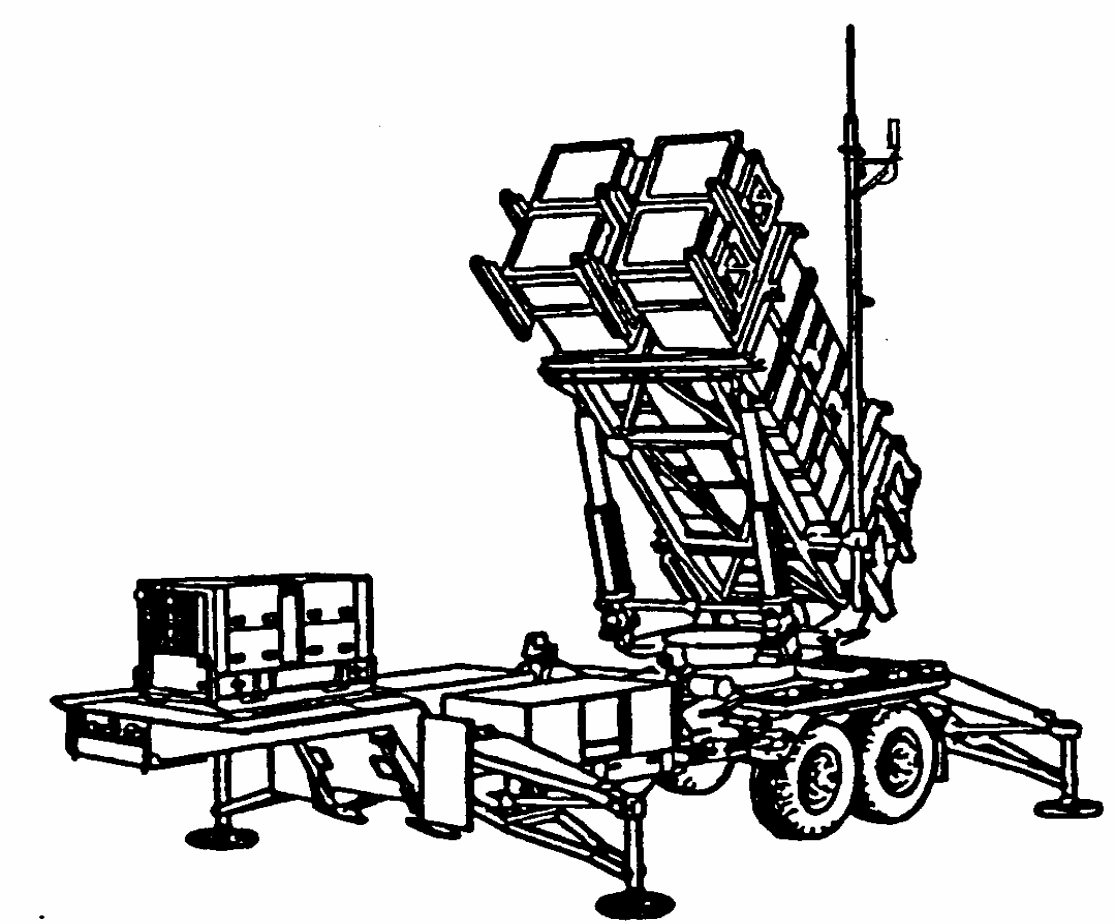


Figure 2-15. PAC-3 LS Emplacement.

PERFORMANCE MEASURES: Crew members listed below complete their performance measures as they are stated in the sequence shown. They must synchronize the completion of like-numbered performance measures.

WARNING
Turn off outrigger power each time crew member leaves outrigger control panel during outrigger deployment.

WARNING
If a GM is dropped a foot or more, it may present hazard. Notify battery commander and await instructions.

Note: If emplacing the LS using Automatic Emplacement procedures, LS GPS cold start, crypto key code loading, and accuracy verification should be performed prior to field exercises. Refer to Appendix B.

CREW MEMBER 1	CREW MEMBER 2
1. Maneuvers LS tractor and trailer to designated position and orients as directed.	1. Orients and positions the LS tractor and trailer to its designated spot and commands, “Halt vehicle”.
Note: For evaluation purposes, time starts here.	Note: For evaluation purposes, time starts here.
a. Halts vehicle; pulls out the tractor PARKING BRAKE control knob.	
b. Pulls out TRAILER AIR SUPPLY control knob. Verifies trailer brake control is off.	

DANGER
Do <u>not</u> stand directly in front of or in back of the vehicle until wheels are chocked. Failure to do so may cause injury or death.

CREW MEMBER 1	CREW MEMBER 2
Note: If FOCA is to be emplaced, refer to Appendix D for emplacement procedures.	
2. When notified by CM 2 that tractor wheels have been chocked, exits vehicle.	2. Obtains chocks from storage compartment.
	a. Chocks tractor.
	b. Notifies CM 1 that tractor wheels are chocked.
Note: Perform step 3e if ground rod is <u>not</u> emplaced. Perform step 3f if ground rod <u>is</u> emplaced.	Note: Uphill—place chocks behind tractor rear wheels curbside and roadside. Downhill—place chocks in front of tractor wheels curbside and roadside.
3. Gets three ground rod sections, three couplings, a driving stud ground clamp, sledgehammer (or driver assembly), and a ground cable from the roadside storage box.	3. Deploys fire extinguishers.
a. Connects a coupling to the ground rod and installs a driving stud. Ensures that the driving stud seats on the ground rod.	a. Removes curbside and roadside travel lock pins.
	Note: Place one chock at rear of roadside rear wheel and the other chock in front of curbside wheel.
	Note: Uphill—place chocks behind semitrailer rear wheels curbside and roadside. Downhill—place chocks in front of semitrailer wheels curbside and roadside.
b. Places ground rod no more than 15 feet from LS ground connector.	b. Deploys trailer chocks and assists CM 1 with ground rods.
c. With sledgehammer (or driver assembly), drives the ground rod section into the ground until the coupling is just above the surface. Removes the driving stud.	

CREW MEMBER 1	CREW MEMBER 2
d. Repeats the procedure using another coupling and ground rod section. Drives the ground rod to a minimum depth of 8 feet to provide an effective ground. Removes the driving stud and top coupling. Stows stud, coupling, and sledgehammer (or driver assembly).	
e. Tightens ground clamp and one end of grounding cable to the ground rod.	
f. Connects the other end of ground cable to semitrailer push-on connector.	
CAUTION Ensure outrigger safety chains are disconnected before lowering outriggers.	
4. Assists as needed.	4. Deploys outriggers.
a. Unhooks outrigger safety chains.	a. Unhooks outrigger safety chains.
WARNING **Keep fingers outside outrigger control box until it is locked open. Cover snaps open and can injure fingers.**	
	b. At outrigger control box, opens and secures cover.
c. Notifies CM 2 that outrigger safety chains are disconnected.	c. Lifts red safety guard for POWER safety ON/OFF switch and sets to ON.
	d. Ensures leveling device lamp is on (red). Power is supplied to switches.

CREW MEMBER 1	CREW MEMBER 2

Note: At night, crew members must be careful to coordinate their work and signals while lowering outriggers and uncoupling tractor from semitrailer. Use lights to signal for all operations that require signals. Use lights to ensure area is clear before starting. Make all movements slow and deliberate. Do not rush. One crew member operates outrigger controls. Another crew member observes outrigger and semitrailer. Observer should signal operator when area is clear and keep operator informed of outrigger and semitrailer condition.

CAUTION
Do not use outrigger control switches in diagonal pairs.

WARNING
Ensure that personnel are clear of outrigger movement and clear of LS before using outrigger controls.

5. Clears personnel from around outriggers and semitrailer area.

   a. Proceeds to rear LS trailer to aid CM 2 in outrigger deployment.

   b. Verifies rear outriggers have firm contact with the ground. Notifies CM 2 when rear outriggers contact the ground.

5. Checks with CM 1 to ensure area is clear of personnel.

   a. In tandem, holds down the two rear outrigger control switches (on left, facing box).

   b. Releases control switches when signaled that the rear outriggers have touched the ground.

   Note: For uneven terrain, ensure outrigger arms will lower below the trailer height and trailer will level. If not, relocate LS to terrain level enough to meet leveling requirements.

CAUTION
Do not lift front of trailer high enough to put pressure on tractor fifth wheel.

CREW MEMBER 1	CREW MEMBER 2
6. Goes to front roadside outrigger, coordinates with CM 2, and signals when front outriggers support the front of trailer.	6. In tandem, holds down the two front outrigger control switches (on right, facing box).
a. Ensures outriggers have firm contact with the ground.	a. Releases switches when outriggers firmly touch ground and trailer weight is off kingpin plate. (Do not lift trailer off tractor fifth wheel.)
b. Signals CM 2 to lower front outriggers until the trailer breaks contact with the fifth wheel and daylight can be seen.	b. Continues to operate outrigger controls box receiving signals from CM 1.
	c. Turns off power at the outrigger control box panel.
7. Uncouples tractor from trailer.	7. Clears personnel from around trailer and tractor coupling.
a. Removes and stows trailer air brake lines and intervehicular cable.	a. Assists as needed.

WARNING

Verify that tractor wheels are chocked <u>before</u> proceeding with next step.

DANGER

Do <u>not</u> stand between tandem wheels of tractor when coupling or uncoupling trailer. Trailer <u>must</u> be resting on both front outrigger pads and wheels should be chocked. Failure to do so may cause permanent injury or death.

b. At tractor fifth wheel, pulls out secondary lock release handle and hooks in out position. Pulls out primary lock release handle and hooks in out position.

CREW MEMBER 1	CREW MEMBER 2
c. Climbs into cab of tractor. When all personnel are clear of area, pushes in PARKING BRAKE control knob and moves tractor forward. Stops when signaled by CM 2.	c. When personnel are clear of area, removes chocks from tractor wheels. Signals CM 1 forward until tractor fifth wheel clears trailer gooseneck. Signals CM 1 to stop.
d. Sets transmission to NEUTRAL and pulls out PARKING BRAKE control knob. Leaves the engine running.	d. Replaces one chock in front of curbside rear tandem wheel and the other chock at rear of roadside rear tandem wheel.

DANGER

Do not leave tractor unattended before chocking wheels. Tractor may roll, resulting in injury or death.

e. When notified by CM 2 that chocks are emplaced, exits cab.	e. Notifies CM 1 that tractor wheels are chocked.

Note: Trailer must be leveled as close to center ring as possible but not outside fifth ring, as shown by level indicator at bottom of outrigger control box cover. At least one trailer wheel on each side must be off the ground.

CAUTION

Do not use outrigger control switches in diagonal pairs.

8. Assists CM 2 with leveling of the LS. Notifies CM 2 that the LS is clear of personnel.	8. When notified by CM 1 that launcher is clear, turns on power at outrigger control panel.
a. Positions himself at trailer roadside and observes outriggers. Signals CM 2 to raise gooseneck approximately 18 inches above fifth wheel.	a. When signaled by CM 1, raises outrigger switches until gooseneck is approximately 18 inches above the fifth wheel.

CREW MEMBER 1	CREW MEMBER 2
b. Signals CM 2 to raise rear outriggers until trailer wheels are off the ground and then notifies CM 2 to level trailer.	b. When signaled by CM 1, raises rear outriggers until trailer tires are clear of the ground. c. Uses outrigger control switches in conjunction with level indicator on inside of cover. Note: Use a single outrigger control switch if one outrigger has to be moved more than another.

SWITCHES	OUTRIGGERS
Right top and bottom	Two front
Left top and bottom	Two rear
Top two	Two roadside outriggers
Bottom two	Two curbside outriggers

DANGER

Ensure <u>all</u> four outriggers have firm contact with the ground. Otherwise, death or serious injury can result.

	d. When signaled by CM 1, sets POWER ON/OFF switch at outrigger control box to OFF. Closes red safety guard. Closes and secures cover.
e. Ensures roadside outrigger pads have firm contact with the ground.	e. Ensures curbside outrigger pads have firm contact with the ground.
f. Removes roadside chock block from rear axle wheel of semitrailer and stows.	f. Removes curbside chock block from rear axle wheel of semitrailer and stows.

CREW MEMBER 1	CREW MEMBER 2

CAUTION
Equipment damage can result if both travel lock pins are not completely removed and stowed.

9. Drains semitrailer air tank by pulling T-handle at rear of semitrailer and assists as needed.

9. Prepares launcher platform and extends fender and side work platforms into work positions.

DANGER
Do not start generator set until the LS is connected to a suitable ground. Serious injury or death by electrocution can result from operating an underground LS.

CAUTION
The generator set may be damaged if the slave receptacle is used for any purpose other than slave starting.

WARNING
Generator load banks are not to be installed or used with the Patriot launcher generator set.

Note: If launching station is not equipped with a TQG, perform step 10. For launching stations equipped with a tactical quiet generator set MEP 814A, proceed to step 11.

10. Starts generator set.

10. Prepares ELES and DLTM for the application of power.

CREW MEMBER 1	CREW MEMBER 2
a. Performs before operation-checks and services described in TM 9-6115-464-12.	a. Removes water from DLTM (A2) door channels with cloth or sponge, if necessary. Ensures that the following switches are in the following positions. (1) All DLTM and PDU circuit breakers are set to OFF. (2) At the DLTM PROCESSOR A2A4, ensures the COMPUTER and MODE SELECT are set to 0 or 1 and the SELECT switch is set to FRONT.
b. Opens and latches generator control cubicle and air vent doors.	b. At ELES, ensures the following circuit breakers and switches are set as follows: **WARNING** **Ensure LAUNCH ENABLE/DISABLE switch is set to DISABLE to prevent inadvertent launch command signals from ECS when electrical power is applied.** (1) LAUNCH ENABLE/DISABLE switch to DISABLE. (2) LOCAL/REMOTE key removed. (3) ELES POWER switch to OFF. (4) DIAGNOSTIC UNIT switch to OFF.

CREW MEMBER 1	CREW MEMBER 2
	WARNING **Ensure CANISTER CONNECT/DISCONNECT switches are set to DISCONNECT to prevent powering missile pyrotechnic circuits when electrical power is applied.**
	(5) CANISTER CONNECT/DISCONNECT switches to DISCONNECT (MISSILE DISCONNECTED lights will not come on because of no electrical power).
	(6) PANEL LAMPS to OFF.
	(7) BRIGHTNESS control to BO (fully ccw).
c. Sets controls and verifies indicators as follows:	c. Verifies torque value of canister tie-down bolts (refer to Appendix I).
(1) DC control circuit breaker to CLOSED position (pushed in).	
(2) START/RUN/STOP to RUN	
(3) BATTLE SHORT safety guard lifted and switch set to ON. (Fuel transfer will make a clicking sound when transferring fuel into day tank).	
(4) FUEL LEVEL gauge indicates acceptable fuel level.	
d. At the upper right corner of the panel, verifies lights indicate as follows:	
(1) UNDER VOLT is on.	

CREW MEMBER 1	CREW MEMBER 2

(2) LOW OIL PRESS is on.

(3) UNDER FREQ is on.

e. When day tank is full (about 2 minutes) and clicking sound stops, sets the BATTLE SHORT switch to OFF and replaces the safety guard.

f. Holds the TEST or RESET switch to TEST. Observes all fault indicators are set to ON. Releases switch.

CAUTION
Do not crank the engine over 15 seconds. Allow the starter to cool at least 3 minutes between cranking.

Note: If the outside temperature is 50 degrees Fahrenheit (10 degrees centigrade) or below, perform step g below. If the temperature is above 50 degrees Fahrenheit (10 degrees centigrade), perform step h below.

g. Starts the generator set under cold weather conditions (if temperature is 50 degrees Fahrenheit (10 degrees centigrade) or below.

CAUTION
Do not inject ether more than three times.

Note: If engine fails to start after injecting ether three times, cease operation and notify maintenance.

CREW MEMBER 1	CREW MEMBER 2

(1) Starts the generator set using start aid. Holds START/RUN/STOP switch to START. At the same time, sets the ENGINE PRIMER switch to ON momentarily and then releases the ENGINE PRIMER.

(2) Continues to hold the START/RUN/STOP switch to START until the OIL PRESSURE gauge indicates 30-55 psi and the VOLTS AC meter indicates voltage. (Do not hold longer than 15 seconds.)
Note: If engine fails to start within 15 seconds, release the START/RUN/STOP switch. Allow at least 3 minutes for the starter to cool before trying to start again.

(3) When the engine starts, sets the START/RUN/STOP to RUN.

Note: If time permits, let engine warm up for 3 minutes without a load applied.

h. Starts the generator set normally (if temperature is 50 degrees Fahrenheit [10 degrees centigrade] or above).

(1) Holds the START-RUN-STOP switch to START until the OIL PRESSURE gauge indicates 30 to 55 psi and the VOLTS AC meter indicates voltage. (Do not hold longer than 15 seconds.)

Note: If the engine fails to start within 15 seconds, release the START-RUN-STOP switch. Allow starter to cool for 3 minutes and repeat step (1) above. If engine does not start after three tries, notify engineer maintenance.

(2) When the engine starts, sets the START-RUN-STOP switch to RUN.

CREW MEMBER 1	CREW MEMBER 2

i. Checks the voltage output for 120 VAC for each line-to-neutral and 208 VAC line-to-line on the VOLTS AC meter on the control panel. Adjusts the voltage if necessary, using the VOLTAGE ADJUST control.

j. Checks the frequency for 400 ±2 hertz on the frequency meter. Adjusts the frequency if necessary, using the FREQUENCY ADJUST control.

k. Rolls up and secures louver covers.

Note: During generator warm-up, CM 1 may assist CM 2 with FOCA emplacement and torquing the GMCs.

11. Starts generator set (TQG).

a. Performs before-operation checks and services per TM 9-6115-643-10.

b. Places DEAD CRANK switch to NORMAL position.

c. Places AM-VM transfer switch in a position corresponding to terminal load connections per TM 9-6115-645-10, Table 2-4. Ensures PARALLEL UNIT switch is in UNIT position.

d. Places MASTER SWITCH to PRIME and RUN position.

e. At malfunction indicator panel, pushes PRESS-TO-TEST push button and ensures all lights are lit; releases PRESS-TO-TEST push button and ensures all lights are off.

f. At control panel assembly, presses BATTLE SHORT light and ensures light is lit; releases PRESS-TO-TEST light and ensures light is off.

CREW MEMBER 1	CREW MEMBER 2

g. At control panel assembly, presses AC INTERRUPTER light and ensures light is lit; releases PRESS-TO-TEST light and ensures light is off.

CAUTION

Do not crank engine in excess of 15 seconds. All starter to cool at least 15 seconds between attempted starts. Failure to observe this caution can result in damage to the starter.

Note: At temperatures below 40 degrees Fahrenheit (4 degrees centigrade), it may be necessary to use the cold weather starting aid. Turn MASTER SWITCH to PREHEAT for 30 seconds.

h. Rotates MASTER SWITCH to START position.

i. Holds MASTER SWITCH in START position until oil pressure reaches 25 psi (172 kPa), voltage has increased to its approximate rated value, and engine has reached stable operating speed.

Note: If operating with an auxiliary fuel source, rotate MASTER SWITCH to PRIME and RUN AUX fuel position.

j. Releases MASTER SWITCH to PRIME and RUN position.

Note: If time permits, let engine warm up for 5 minutes without load applied.

k. Turns VOLTAGE and FREQUENCY adjust potentiometers to required values for voltage and frequency.

l. Presses GROUND FAULT INTERRUPTER TEST push button and ensures window is clear; presses RESET push button and ensures indicator is red.

CREW MEMBER 1	CREW MEMBER 2

m. Checks COOLANT TEMP and OIL PRESSURE indicators for normal readings.

(1) COOLANT TEMP reading should be 170 to 200 degrees Fahrenheit (77 to 93 degrees centigrade).

(2) OIL PRESSURE reading should be 25 to 60 psi (172 to 414 kPa).

n. Ensures voltage and frequency are still at rated values. Adjusts as necessary.

o. Rolls up louver covers.

WARNING

Observe actions of CM 2 during assembly of DLT antenna, and warn CM 2 of any unsafe conditions.

WARNING

Observe actions of CM1 on forward outrigger, and warn CM 1 of any unsafe conditions.

WARNING

Data link antenna may be hot. Wear protective gloves to keep from injuring hands.

CAUTION

Remove DLU antenna with extreme care to prevent damage.

Note: At night, crew members must be careful to coordinate their work and signals while mating the data link mast assembly.

CREW MEMBER 1	CREW MEMBER 2

CAUTION
Use extreme care when removing DLU antenna, to prevent damage to GPS antenna.

12. Stands on LS; assists CM 2 with installing data link mast assembly.

12. Climbs up on roadside maintenance platform, releases two antenna storage tube catches, and assisted by CM 1, removes data link antenna.

a. Takes antenna element from CM 2; slides antenna base into lower mast.

a. Passes antenna element to CM 1 for installation.

b. Disconnects ground cable from storage connector and connects to ground adapter.

c. Disconnects RF cable from dummy connector, and connects RF cable to RF adapter.

d. Installs dust caps on dummy connectors.

CAUTION
The generator must run 3 or 5 minutes (as applicable) for warm-up before the circuit breaker is closed.

Note: If fiber-optical cable assembly is to be emplaced, proceed to Appendix D for emplacement procedures.

13. Checks and closes the generator circuit breaker as follows:

13. Verifies with CM 1 that generator warm-up time has elapsed.

CREW MEMBER 1	CREW MEMBER 2
a. At generator control panel, holds CKT BKR switch to CLOSE until CKT BKR lamp comes on, indicating main load contactor is closed.	
b. Verifies all generator fault lamps are off.	
CAUTION If <u>any</u> generator set fault lamp comes on, stop the engine and notify engineer maintenance	
c. Checks oil pressure gauge (30 to 55 psi).	
d. Checks temperature gauge (170 to 200 degrees Fahrenheit).	
e. Closes and secures the control cubicle access doors.	
f. Sets A1A3 circuit breakers CB1 and CB2 to ON.	
g. Notifies CM 2 to energize the DLTM.	g. When notified by CM 1, energizes DLTM (A2). (1) Sets LAMPS switch to ON. (2) Sets BLOWER circuit breaker to ON. (3) Checks that BLOWER OPR light is on.
	Note: Ensure the BLOWER OPR light is on before continuing. (4) Sets PWR SPLY circuit breaker to ON. (5) Verifies PS1 and PS2 lights are on.

CREW MEMBER 1	CREW MEMBER 2
	(6) Sets RADIO circuit breaker to ON.
	(7) Sets SBU circuit breaker to ON.
	(8) Sets DGTL PROCESSOR circuit breaker to ON.
	(9) Sets PROCESSOR FAULT IND circuit breaker to ON.
	(10) Sets MAPS circuit breaker to ON.
	(11) Sets LAMPS switch to OFF.
	h. At power supply A2A3, verifies MAPS circuit breaker is on (AEE).
	i. At processor A2A4, verifies panel display indicates LS DLU-DP and BANK: ____:? ADDRESS: ___:?.
j. Acknowledges notification from CM 2.	j. Notifies CM 1 to power up ELES.
14. Dismounts LS and opens ELES door.	14. Performs DLT self-test.
	a. At radio AN/VRC-90A, sets CB1 to OFF.
	b. Disconnects W15P2 from AUD/DATA.
	c. At power amplifier, disconnects W13P1 from J1 ANT.
	d. At radio AN/VRC-90A, sets CB1 to ON and ensures POWER indicator is on.
	e. At radio AN/VRC-90A, sets FCTN to SQ ON.
	f. At A2A8 (mounting adapter), sets data rate to OFF.

CREW MEMBER 1	CREW MEMBER 2
	g. At radio AN/VRC-90A, presses DATA/4 key. Observes OFF display. Note: If OFF does not display, press CHG/7 key. Repeat until OFF displays. h. At radio AN/VRC-90A, sets the following: (1) MODE to FH. (2) COMSEC to CT. (3) RF PWR to M. (4) DIM fully clockwise. (5) VOL/WHSP pushed in and turned fully clockwise. (6) FCTN to TST. Observes GOOD display. Note: If GOOD displays, radio has passed self-test. If above indicators were not observed or FAIL 1 displayed, set FCTN to STBY, then repeat step h (6). If radio fails self-test a second time, call organizational maintenance.
15. Energizes the ELES.	15. Synchronizes the DLTM.

CREW MEMBER 1	CREW MEMBER 2
	Note: If radio has not been powered down for more that 24 hours and FCTN switch was not set to OFF or Z-FH, perform Quick Start procedures (step a, below). If radio has been powered down for more than 24 hours, or FCTN switch was set to OFF or Z-FH, perform Full Load Start procedures per Appendix B. If frequency hopset (FH), COMSEC codes, or TOD SYNC time need to be loaded into radio AN/VRC-90A, then perform Full Load Start procedures per Appendix B.
a. At the ELES launch control unit, performs the following:	a. Determines if frequency hopset is loaded in ICOM radio as follows:
(1) Sets ELES POWER switch to ON.	(1) Sets CHAN to appropriate position.
(2) Sets BRIGHTNESS control to MAX.	(2) Verifies FCTN set to SQ ON.
(3) Verifies AC POWER BITE is green.	(3) At keypad, presses FREQ key and observes display.
Note: If AC POWER BITE is red, at ELES AC compartment, perform the following steps: Verify CB1 and CB2 are set to ON. If CB1 and CB2 are set to ON, reset both circuit breakers by setting to OFF then back to ON. If AC POWER BITE remains red after performing the two steps above, call organizational maintenance.	Note: If Hopset net ID F(n)(n)(n) displays, (n=0-9), hopset is loaded; proceed to step b. If F(n)(n)(n) does not display, hopset is not loaded; perform ICOM radio Full Load Start procedures per Appendix B.
b. Verifies ELES POWER PHA, PHB, and PHC lights are on.	b. Determines if TOD is loaded in ICOM radio as follows:
	(1) Presses • • •/Time key three times; observes display.
	(2) Verifies TOD clock is running and day, hour, minute, and second values agree with established reference time.

CREW MEMBER 1	CREW MEMBER 2
Note: Wait for PBIT to complete before LOCAL light comes on.	Note: If TOD clock is running with correct time, proceed to step c. If TOD clock is not running with correct time, perform ICOM Radio Full Load Start procedures per Appendix B.
c. At LCU control display panel (CDP), verifies the following indications:	c. Determines if COMSEC is loaded in ICOM radio as follows:
(1) Applicable TYPE light (PAC-2 or PAC-3) comes on.	(1) Connects Handset H-250/U to AUD/DATA connector
(2) WAIT, then PBIT is displayed.	(2) Sets CHAN to appropriate position.
(3) After approximately 40 seconds, CDP displays ELES STATUS menu.	(3) Sets COMSEC to CT
	Note: If no sound is heard in the handset, press and release the push-to-talk button several times. If a beep is heard after each press, COMSEC is loaded; proceed to step d. If a steady beep or no beep is heard, COMSEC is not loaded; perform ICOM Radio Full Load Start procedures per Appendix B.
d. From ELES menu, selects ELES.	d. Disconnects handset from AUD/DATA.
e. Observes PAC-2 or PAC-3 status from ELES STATUS menu.	
f. After approximately 10 seconds, PCMC light displays POWER.	
g. Verifies CDP displays correct BANK and LS number.	
(1) If CDP displays correct BANK and LS number, proceeds to step h.	
(2) If not, performs the following:	

CREW MEMBER 1	CREW MEMBER 2

(a) From ELES STATUS menu, selects MAIN menu.

(b) From MAIN menu, selects LS SETUP. From LS SETUP menu, selects SELECT BANK.

(c) From SELECT, selects applicable bank A through F.

(d) Observes display returns to LS SETUP; verifies BANK number is correct.

(e) From LS SETUP, selects LS NUMBER.

(f) From SELECT, selects LS number 1 through 8.

(g) Observes display returns to LS SETUP and verifies LS number is correct.

(h) Returns CDP to MAIN menu.

WARNING

DLTM processor A2A4 LCD display must indicate LS DLU-DP before proper missile hazard light can be obtained on display panel A1A3.

h. Sets and holds STATUS LAMPS TEST switch in TEST.

i. Verifies all status lights come on.

j. Releases STATUS LAMP TEST switch.

k. Verifies all status lamps except AC POWER BITE, PCMC, ELES Power, LOCAL, and TYPE indicator lights go out.

CREW MEMBER 1	CREW MEMBER 2

WARNING

If any one of the missile hazard lights come on and a live missile is present with MIM-104 GM/PAC-3 connected at location indicated by a light, ordnance devices may explode, resulting in injury or death to personnel.

l. At DLT processor, verifies LS DLU-DP is displayed. If not displayed, presses COMPUTER RESET. After approximately 15 seconds, verifies LS DLU-DP displays.

m. At all positions that have live missiles with umbilical connected, verifies all MISSILE HAZARD lights are off.

m. At the DLT processor, verifies BANK (A-F) and ADDRESS (1-8) with CM 1.

CAUTION

If launcher platform is rotated cw or ccw from the 180-degree stow position and then moved back to or past the 180-degree position with the engagement control handle not in the rotate position (Z-LOCK EXTENDED), damage to the launcher platform can occur.

n. At CDP, turns on missile heaters, if needed, as follows:

(1) From MAIN menu, selects LS SETUP.

(2) From LS SETUP menu, selects HTRS.

Note: A warm-up time of up to 10 minutes may be necessary before missiles are sufficiently heated.

(3) From HEATER MENU, depresses applicable ON/OFF push-buttons for heaters to be turned on.

CREW MEMBER 1	CREW MEMBER 2

DANGER

Visually check any missile hazard light that is on. If position has a live missile with umbilical connected, immediately notify ECS, and advise ECS that the LS will remain in LOCAL mode. Leave area and await further instruc6ions. Missile device may explode, resulting in injury or death.

Note: Steps 16, 17, and 18 are performed to verify operational status of AEE equipment. If AEE equipment is not available or non-operational proceed to Appendix E and perform manual alignment procedures.

16. Verifies NFS operational status.

a. At NFS (A10), opens access cover.

b. Observes NFS displays as follows:

(1) If nnn.n AZIMUTH and POWER display, NFS passed self-test. Proceeds to step 16f.

(2) If AZIMUTH does <u>not</u> display—

(a) Presses OFF.

(b) Presses ON.

c. Observes all LCD characters display momentarily.

16. Returns radio to operation as follows:

a. If radio silence is required—

(1) Sets FCTN to STBY.

(2) Connects W13P1 to J1 ANT.

(3) Connects W15P2 to AUD/DATA.

b. If radio silence is not required—

(1) Connects W13P1 to J1 ANT.

(2) Connects W15P2 to AUD/DATA.

c. Sets FCTN to SQ ON.

CREW MEMBER 1	CREW MEMBER 2
d. Observes display flashes three times and WAIT displays momentarily.	d. Sets RF PWR per Communications Plan.
e. Observes on display, the last azimuth value stored in memory, and AZIMUTH.	e. Sets DATA RATE to 16000.
(1) If the above indications were observed, NFS passed self-test	
(2) If the above indications were not observed (or a failed message displayed), returns to step b (2) and reruns the procedure.	
f. Presses ALIGN.	f. Presses DATA/4 key.
g. Raises and secures NFS access cover.	g. Presses CHG/7 key until 16000 is displayed.
17. Verifies PLGR operational status.	17. Performs LS Late Net Entry as follows:
a. If PLGR display is off, performs the following:	a. Presses FREQ key; observes F (n) (n) (n) is displayed.
(1) Presses 1/ON/BRT key.	
(2) Verifies the display cycles from Blank, Copyright, and No Faults Found.	
b. If PLGR display screen is on, observes display for the following:	b. Presses SYNC/3 key; observes LF (n) (n) (n) is displayed until LS is synchronized with ECS.
(1) If the warning “LOW MEMORY BATTERY” appears, replaces memory battery or calls maintenance.	
(2) If “OLD” displays while PLGR is searching for a new position, it may take up to 15 minutes to get a new position.	

CREW MEMBER 1	CREW MEMBER 2
c. If one or both of the “OLD” displays are shown, PLGR has passed self-test. Proceeds to step 19.	c. Verifies “L” disappears and LS is synchronized with ECS.
d. If current mode and position are shown, PLGR has passed self-test and calculated the new position. Proceeds to step 19.	
e. If the above indications were not seen, PLGR has failed self-test; reruns procedures, starting with step 17b.	
f. If PLGR fails a second time or “FAILURES FOUND” displays, reports failure to the TCO and awaits instructions.	
18. Verifies PLGR crypto key status.	
a. Presses 3/MENU key and observes MENU display appears; presses 3/MENU key again, and observes MENU, page 2, appears.	
(1) If “CRYPTO” appears on fourth line of display, goes to step b.	
(2) If “CRYPTO” does not display on fourth line, crypto codes are not loaded. Reloads codes per Appendix C.	
b. Presses 8/POS key and verifies current mode and position displays.	
c. If current mode and position display, PLGR is operational.	

Note: If after second attempt, current mode and position do not display, notify TCO that PLGR operational status cannot be verified. Proceed per TCO's instructions.

CREW MEMBER 1	CREW MEMBER 2
19. If GMs are to be electrically connected, proceeds as follows; if not, proceeds to step 20.	19. If fiber-optic cable assembly was installed, ensures the slave bus unit A2A7 is powered up as follows:
a. Verifies all MISSILE HAZARD lights are OFF for each missile connected before continuing.	a. Opens and lowers cover.
b. Raises CONNECT DISC switch cover.	b. Verifies 2S41 switch is on and GO indicator is on.
c. Holds CONNECT/DISC switches to CONNECT until MISSILE DISCONNECTED lights go off	c. Raises and closes SBU cover.
	WARNING Use care when closing radio access door. Injury to fingers or hands may occur.
d. Notes missile heat time and relays to the ECS as soon as possible.	d. Closes and secures all doors to DLTM.

WARNING
Ensure that personnel are clear of LS trailer <u>prior</u> to elevating and rotating the platform.

Note: If manual alignment procedures are to be performed, refer to Appendix E.

20. Assists CM 2 elevate and rotate LS platform.	20. Elevates and rotates LS platform.

Note: Before continuing, verify both travel lockpins are removed and stowed.

CREW MEMBER 1	CREW MEMBER 2
	a. Sets engagement control handle to ELEV. b. At CDP MAIN MENU, selects LS SETUP. c. From LS SETUP MENU, selects MOVE PLTFRM. d. From PLTFRM MENU, selects RAISE PLTFRM. Note: Launcher platform may be stopped at any position between limits by selecting STOP. e. From RAISE PLTFRM MENU, selects START. f. Observes PLTFRM MOVING is displayed. g. Verifies PLTFRM RAISED is displayed and PLATFORM RAISED light comes on when launcher platform reaches launch angle. h. Sets engagement control handle to ROTATE. Verifies that AZIMUTH READY lamp is on.
21. Observes outrigger pads as LS platform is rotated cw and then ccw. a. Verifies all outrigger pads stay firmly on the ground. b. Verifies curbside outrigger pads have firm contact with the ground. c. Verifies LS is level. d. Verifies Engagement Control Handle is in elevate before mounting launcher.	21. Directs CM 1 to observe outrigger pads. a. Rotates LS platform fully cw, then fully ccw. b. Verifies roadside outrigger pads have firm contact with the ground. c. Verifies LS is level.

CREW MEMBER 1	CREW MEMBER 2
	Note: If any outrigger lifts off the ground, sinks, or shifts during rotation, stop rotation. Adjust outrigger until firmly on the ground. Observe that LS is level within 5 degrees; if not, re-level and repeat step 21.

Note: If GM torque tube handles are to remain locked or if emplacing a PAC-3 LS with PAC-3 missiles, skip step 22.

22. Assists CM 2 as required with unlocking torque handles; verifies no missile hazards exist.	22. Unlocks torque tube handles (upper and lower) as follows:

WARNING

Observe actions of other crew members on launcher platform. Warn crew members of any unsafe conditions.

Note: GMs must be unlocked in the following order: upper right, lower right, upper left, lower left.

a. Notifies CM 2 that it is safe to mount LS platform.	a. When notified by CM 1, mounts launcher platform.
b. Verifies status of MISSILE READY and MISSILE HAZARD lights as CM 2 unlocks torque handles.	b. Cuts and removes safety wire.
	c. Removes quick-release pin by the GM torque tube handle.
	d. Pulls the torque tube handle spring-loaded plunger and rotates it ccw to its unlocked position. Ensures the plunger locks in place and red shows to the left of torque tube handle.
	e. Installs the quick-release pin removed in step c.

CREW MEMBER 1	CREW MEMBER 2
	f. Repeats steps b through e for all four GMs in the following sequence: upper right, lower right, upper left, lower left.
g. Places Engagement Control Handle in rotate.	g. Dismounts from LS; notifies CM 1.
23. Ensures guardrail around generator set is installed if removed earlier.	23. Disconnects 28 VDC power cable and removes cable plug from tractor receptacle.

WARNING

With the DLU and fiber-optic cable installed, the curbside stowage box access cover is heavy. Two people are required to open or close access door, to prevent personal injury.

24. With the assistance of CM 2, closes curbside stowage box.	24. Assists CM 1 with closing curbside stowage box, if required.

Note: If LS is to be placed in remote, refer to step 29.

25. Conveys the launcher location and alignment data to the ECS as soon as possible.	25. Removes and stores tractor wheel chocks.
26. When CM 2 enters cab of tractor, reports to the ECS operator that emplacement of LS number is complete.	26. Enters cab.
27. Proceeds to a prearranged staging area a safe distance from LS.	27. Proceeds to prearranged staging area a safe distance from LS.

Note: The following procedures are necessary for transferring control of the LS to the ECS in order to obtain ready-for-action (fully operational) status. These procedures provide broad guidance for the LS crew members and are written in general terms to allow for tactical situation input. The procedures rely on a properly emplaced and energized LS. The LS has been properly sited at the designated location and powered up. Equipment manning requirements and tactical actions conform to the SOA to which ordered. Required equipment checks have been performed to attain the necessary readiness posture in the time required.

CREW MEMBER 1	CREW MEMBER 2

28. Requests verification with the ECS crew members that they are ready for LS (number) to be placed in remote and control to be transferred to the ECS.

29. When notified by ECS crew members, places PAC-3 LS in remote mode as follows:

a. Observes the following conditions exist at the ELES:

(1) AC POWER light is green.

(2) ELES POWER PHA, PHB, and PHC lights are green.

(3) TYPE PAC-2 (white) or PAC-3 (green) are on.

(4) LOCAL and LCHR READY lights are green.

b. From CDP MAIN MENU, selects STATUS MENU.

c. From ELES STATUS, determines LS status.

(1) If MIM-104 GMs are loaded on LS, performs the following:

(a) Selects MRR STATUS.

(b) From MRR STATUS, selects STATUS MENU.

(2) If PAC-3 GMs are loaded on LS, proceeds to step d.

d. From ELES STATUS, selects ELES.

e. From ELES STATUS, observes PAC-2 or PAC-3 status.

CREW MEMBER 1	CREW MEMBER 2

f. From ELES STATUS, selects MAIN MENU.

g. Verifies MAIN MENU appears.

h. Sets LAUNCH ENABLE/DISABLE switch to ENABLE.

DANGER

The LS platform can be rotated remotely from the ECS 1 minute after the LOCAL -RMT switch is set to RMT. Personnel must leave area immediately afterward. Failure to do so can result in death.

i. Inserts key in LOCAL-REMOTE switch and positions to REMOTE.

Note: For evaluation purpose, time stops here.

j. Closes ELES door.

k. Evacuates the area immediately.

l. Notifies the ECS that LS (number) is in remote and ready for action.

Note: If manually emplaced, convey the launcher location and alignment data to the ECS ASAP.

COACHING POINT: The performance measures are completed in the sequence outlined. All crew members do their like-numbered performance measures at the same time. When all the performance measures have been mastered and all crew members can do their jobs without coaching, go for speed and remember to be safety-conscious. The more the drill is performed, the better the crew members will perform together.

RUN-THROUGH INSTRUCTIONS: The crew members should practice this drill until they can perform the drill according to the standard without using the drill book. The initial run-through should be conducted slowly. The crew members should change positions in order to learn all steps and standards.

PERFORM: When the crew members can perform this crew drill to standards, inform the platoon sergeant or platoon leader that the crew members are ready to be evaluated.

SUPPORTED T&EOs

ARTEP NUMBER	T&EO NUMBER	T&EO TASK TITLE
44-637-30-MTP	44-2-9004	Emplace the Firing Battery

2-6. CREW DRILL 44-5-D020.

TASK: Prepare the PAC-3 LS for Road March (44-5-D020).

CONDITIONS: The battery has been ordered to occupy a new position. The PAC-3 LS is in the emplacement configuration. All components of the LS are available and operational. A crew has been assigned to prepare and march order the LS in all environmental and NBC conditions, both day and night. The march order command has been received.

STANDARDS: March order the PAC-3 LS by the performance measures as sequenced in this drill. Complete this drill within 25 minutes when in a training environment.

Notes:

- Allow additional march order time when fiber-optic cables are installed.
- The time required to perform this drill in MOPP 4 will increase per ARTEP 44-637-30-MTP Figures 5-1 and 5-2.

SUPPORTING INDIVIDUAL TASKS: Supporting individual tasks for this drill are listed in Appendix A, Individual Task-to-Drill Matrix.

ILLUSTRATIONS: Figure 2-16.

SETUP INSTRUCTIONS: The following equipment, areas, and personnel must be provided for the drill to be trained correctly.

a. Resources. As a minimum, the following is required: One Patriot semitrailer-mounted guided missile launching station M902 with basic issue items.

b. Training Site. The potential site must be large enough (10x20 meters) to perform all operations for march order. The site should be as level as possible. The maximum allowable slope from front to rear or side-to-side is 10 degrees.

c. Unit Instructions. The crew members must march order the LS.

TALK-THROUGH INSTRUCTIONS: The battery has received a movement order to redeploy to a new field position. The crew members have the responsibility to march order the LS within the prescribed time limits.

a. Orientation. Before beginning drill training, ensure that each crew member knows the purpose of the drill and is briefed on safety awareness.

b. Safety/Fratricide. All soldiers that operate the LS must know that safety hazards exist while operating the various items of equipment. These hazards can and have caused severe injuries to operators. Be extremely careful when working around the LS. Throughout the crew drill, observe all dangers, warnings, and cautions required to properly emplace the LS. All commanders, trainers, and leaders must plan, train, and stress all procedures that must be followed to avoid fratricide. These procedures include IFF, weapon control status, vehicle and aircraft recognition, corridors, routes, zones, flight levels, and other control measures. Munitions cannot distinguish between friend or foe.

c. Demonstration (optional). If a nearby crew has successfully performed the drill, have that crew demonstrate the drill. Explain what is being done and why, using the performance measures as a guide. After the demonstration, summarize.

d. Explanation. Explain the drill in the following manner:

(1) Using a diagram, Figure 2-16, a sand table, or a simple sketch in the dirt, show the crew members how the LS should be march ordered.

(2) Tell the crew members what their duties are in the drill.

(3) Read the performance measures of the drill to the crew members.

(4) Have crew members explain their performance measures to ensure that they understand them.

WALK-THROUGH INSTRUCTIONS:

a. Have crew members take their positions and perform the drill. Use the crawl-walk-run method of training. Start the training slowly. Correct any mistakes the crew members make as they go; do not proceed until drill procedures are performed correctly. After the crew members demonstrate their proficiency at a slow pace, let them do it faster. Remember, however, that safety is never sacrificed for speed. Watch carefully to make sure the crew members achieve all of the standards for the drill.

b. Initiating Cue. The march order command has been received.

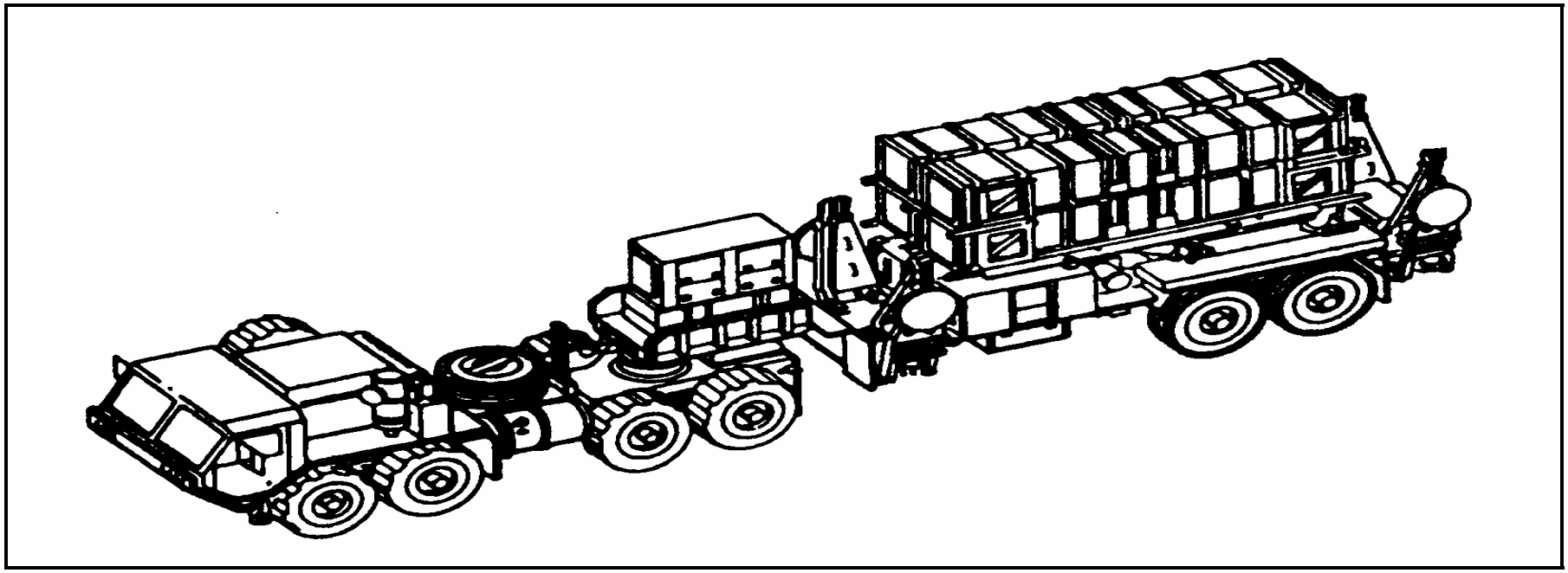


Figure 2-16. PAC-3 LS in March Order Configuration.

PERFORMANCE MEASURES: Crew members listed below complete their performance measures as they are stated and in the sequence shown. They must synchronize the completion of like-numbered performance measure.

Note: Once the guided missiles are removed, there are no explosives on the LS. The LS is unclassified if the data link security equipment is removed.

Note: Before proceeding with this drill, read the notices below.

WARNING

Always observe actions of crew members on launcher platform and warn crew members of any unsafe conditions.

WARNING

Wear hearing protection with 10 meters of operating the LS to prevent loss of hearing.

WARNING

Confirm with the ECS operator that the LS is in the LOCAL mode before approaching the LS. If the LS is in the REMOTE mode, the turntable can be remotely trained by the ECS. Stay clear of the turntable rotation until the LOCAL-RMT switch on the LCU is set to LOCAL, the LOCAL lamp is on, and the key is removed to prevent personal injury.

Note: The DLTM processor A2A4 LCD display must indicate "LS DLU-DP" before proper indications can be obtained on the MSL HAZARD lights. A MSL HAZARD light on the LCU panel indicates a hazardous condition for locations having a live missile with umbilical connected only. The MSL HAZARD light will be on for all locations having a dummy missile, empty canister, empty location, or a live missile with umbilical disconnected but these conditions do not constitute a hazard. If any of the MSL HAZARD indicator lamps are lit, verify with the ECS that a missile is present. When it is determined that a live missile is present with umbilical connected, immediately notify the ECS of the condition indicated and advise that the LS will remain in the LOCAL mode. After notifying the ECS, evacuate the area and await further instructions.

CAUTION

Be very alert at night. Ensure that working area is clear before starting. Make all movements sure and deliberate. Do not rush.

CREW MEMBER 1	CREW MEMBER 2
Note: If fiber-optic cable assembly road march is required, proceed to Appendix D. Verify launcher grounds and fire extinguishers.	
1. Receives and confirms march order with the ECS.	1. Receives and confirms march order with the ECS.
2. Checks fire extinguishers curbside.	2. Checks fire extinguisher and ground roadside.
	a. Sets LOCAL/RMT switch to LOCAL and removes key.
	b. Verifies that the LOCAL light comes on.
	c. Sets ENABLE/DISABLE switch to DISABLE.
	d. Sets STATUS LAMPS switch as desired.
3. Assists CM 2 and ensures personnel are clear of LS trailer if launcher rotation is required.	3. Verifies the launcher is in the stow position. If not, rotates the LS to the stow position by performing the following:
	a. Verifies ENGAGEMENT CONTROL handle is set to ROTATE and PLATFORM AZIMUTH READY LIGHT is on.
	b. On main menu, selects LS SETUP.
	c. On the LS SETUP menu, selects MOVE PLTFRM.
	d. On the MOVE PLTFRM menu, selects ROTATE PLTFRM.
	e. On the MOVE PLTFRM menu, selects STOW AZMTH to align the LS in the STOW position.
4. Locks GM torque tube handles and disconnects GMs.	4. Assists CM 1 with locking GM torque tube handles and disconnecting GMs.
a. Verifies ENGAGEMENT CONTROL is in ELEVATE before proceeding.	a. Places ENGAGEMENT CONTROL in ELEVATE.

CREW MEMBER 1	CREW MEMBER 2
Note: Coordinate with CM 2 to verify that MISSILE READY lights at the ELES go out.	
b. Locks GM torque tube handle(s) in the following order:	b. At the ELES, looks to the rear of launcher for CM 1's signal as he locks each torque tube handle, and then observes MISSILE READY and MISSILE HAZARD lights.
(1) Upper right.	
(2) Lower right.	
(3) Upper left.	
(4) Lower left.	
c. Beginning with upper right GM, removes quick-release pin by torque tube handle.	
d. Pulls out and holds spring-loaded plunger on torque tube handle. Rotates it cw to locked position. Ensure plunger locks in place and no red shows to the left of torque tube handle.	
e. Installs the quick-release pin.	
f. After installing quick-release pin, moves to the launcher roadside corner.	
g. Announces to CM 2, "Restraint pin locked."	g. After receiving signal from CM 1, observes that the corresponding MISSILE READY light goes out.
h. Waits for the signal from CM 2 that MISSILE READY light corresponding to torque tube handle goes out.	h. As each light goes out announce, "No missile hazard, MISSILE READY light out," to CM 1, for each missile.
i. Repeats steps a through g for each GM.	i. Repeats steps a through g for each GM.

CREW MEMBER 1	CREW MEMBER 2
j. Dismounts from LS platform.	j. At the LEM-LCU, verifies all MISSILE READY and MISSILE HAZARD lights are off. k. Raises cover and holds CONNECT-DISC switches to DISC at all positions until corresponding MISSILE-DISCONNECTED lights go on.

Note: If tractor is already positioned, proceed to step 7. CMs 1 and 2 will coordinate for positioning the LS tractor in front of the LS semitrailer for coupling.

WARNING
Prior to movement, ensure personnel are clear of tractor, to prevent injuries.

5. Assisted by CM 2, positions LS tractor for coupling to semitrailer.	5. Assists CM 1 position LS tractor for coupling.
	a. Clears personnel from area of LS trailer, as tractor approaches.
b. Guided by CM 2, backs the tractor in front of trailer so the fifth wheel is just in front of kingpin.	b. Guides CM 1 in backing the tractor in front of trailer so the fifth wheel is just in front of trailer kingpin.
c. Halts vehicle and sets parking brake.	c. Commands, “Halt vehicle”.
d. Sets the tractor shift lever to NEUTRAL. Leaves engine running.	

DANGER
Verify that tractor wheels are chocked before proceeding. Tractor could move, resulting in injury or death.

CREW MEMBER 1	CREW MEMBER 2
	a. Places one chock in front of curbside rear tandem wheel and the other chock at rear of roadside rear tandem wheel .
	b. Notifies CM 1 that tractor wheels are chocked.
	Note: Uphill—place chocks behind tractor rear tandem wheels, curbside and roadside. Downhill—place chocks in front of tractor rear tandem wheels, curbside and roadside.
Note: Carefully route cables and air brake lines from tractor to semitrailer. Be careful not to get grease from fifth wheel on lines or cables.	

WARNING

Make sure area is clear before lowering platform, to prevent injury.

7. Connects tractor air lines and electrical cables to front of semitrailer.	7. Lowers launcher platform.
	a. Verifies ENGAGEMENT CONTROL is set to ELEV.
b. Removes dummy couplings from SERVICE and EMERGENCY air brake hose connectors.	b. At the ELES, verifies the AZIMUTH READY LIGHT is off.
c. Removes dust cap from power supply connector.	c. From MAIN MENU, selects LS SETUP.
d. Prepares outrigger power cable and intervehicular light cable.	d. From LS SETUP, selects MOVE PLTFRM.
e. Connects outrigger power cable to tractor slave connector.	e. From PLTFRM MENU, selects LOWER PLTFRM.
	f. From LOWER PLTFRM, selects START.

CREW MEMBER 1	CREW MEMBER 2
	g. Observes PLTFRM MOVING is displayed, then PLTFRM LOWRD when platform reaches the steady rest position.
CAUTION Azimuth gear train may be damaged if ENGAGEMENT CONTROL handle is <u>not</u> in road march position while traveling.	
	h. Verifies PLTFRM RAISED light goes out; selects <u>MENU</u> and returns to MAIN MENU.
i. Connects the intervehicular light cable and the outrigger power cable to semitrailer connectors.	i. Places the ECH to the road march position.
j. Connects air lines to the trailer.	**Note:** Launcher platform may be stopped by setting the RAISE/ STOP/LWR switch to STOP.
k. At tractor fifth wheel-- (1) Pulls out secondary lock release handle; locks in out position. (2) Pulls out primary lock release handle; locks in out position. (3) Verifies fifth wheel jam plate is just below the trailer gooseneck. **Note:** If necessary, push down fifth wheel tail ramps so ramps are level with, or below, top surface of guide ramps.	
8. De-energizes ELES.	8. Prepares AN/VRC-90A for power down.
a. At the ELES, sets switches to the following positions and verifies the following indications:	a. Removes padlock and opens DLTM doors.

CREW MEMBER 1	CREW MEMBER 2
(1) Verifies all MISSILE HAZARD lights at all positions with cables connected.	**Note:** If power down is not to exceed 24 hours and radio AN/VRC-90A holding memories are to be saved or TOD synchronization is required, perform step b. If power down is to exceed 24 hours or radio AN/VRC-90A holding memories are not to be saved and TOD synchronization is not required, perform step c.
WARNING **Open radio access door carefully to avoid injury to fingers and hands.**	
(2) Sets PANEL LAMPS switch to OFF.	
(3) Verifies all MISSILE DISCONNECTS lights are amber.	
(4) Sets ELES POWER switch to OFF.	
(5) Verifies all CDP lights are off and AC POWER BITE indicator is red.	
	b. At radio, AN/VRC-80A--
	(1) Sets FCTN switch to STBY.
	(2) Sets CB1 to OFF.
	Note: If codes are lost, replace the holdup battery.
9. Notifies CM 2 that ELES is powered; closes and secures doors.	9. De-energizes DLTM-PDU.
	a. In sequence listed, sets the following circuit breakers to OFF:
	(1) PROCESSOR FAULT IND.

CREW MEMBER 1	CREW MEMBER 2
	(2) DGTL PROCESSOR. (3) SBU. (4) PWR SPLY. (5) RADIO. (6) BLOWER. (7) MAPS (8) MAPS (AEE). (9) LAMPS.
b. When notified by CM 2, closes DLTM air inlet and exhaust covers.	b. Notifies CM 1 to secure DLTM air inlet and exhaust covers.
	c. Closes and secures DLTM doors.

WARNING

While on the LS, crew members <u>must</u> watch for and warn each other of unsafe conditions that can cause injury.

10. At ELES PCP, sets MAIN POWER AC CB to OFF.	10. Removes torque wrench, socket, and extension from storage point in preparation for verifying torque values.
11. Opens AC CB on generator to allow for cool down.	11. Assists as needed.

Note: If equipped with a TQG, allow 5 minutes for cool down; if not, allow 3 minutes cool down.

CREW MEMBER 1	CREW MEMBER 2
12. Assisted by CM2, stows data link mast assembly.	12. Assists CM1 stow data link mast assembly.

WARNING

Data link mast may be hot. Wear protective gloves to prevent injury to hands.

CAUTION

Be alert at night. Ensure work area is clear before starting. Make all movement sure and deliberate. Do not rush.

a. Removes dust cap from dummy RF connector.

b. Disconnects RF cable; connects cable to RF dummy connector.

c. Installs dust cap on RF adapter.

d. Disconnects ground cable from ground connector and installs dust caps.

e. Stows ground cable in spring clip on antenna.

CAUTION

Use extreme care when stowing DLU antenna into storage tube so not to damage the GPS antenna assembly.

f. Slides antenna element out of lower mast assembly and passes to CM 2 for stowing.	f. Takes antenna element from CM 1 and stow into antenna storage tube; secure with two latches.
13. When notified by CM 2, closes and secures air inlet and exhaust covers.	13. Assists as needed.

CREW MEMBER 1	CREW MEMBER 2
14. Installs travel lockpins.	14. Verifies torque value of canister tie-down bolts (refer to Appendix I).
15. Raises and folds over roadside side work platform and secures after CM 2 has finished torquing GMCs on the roadside.	15. Continues verifying torque values.

Note: If launching station is equipped with TQG set MEP 814A, skip step 16 proceed to step 17.

CAUTION
Use extreme care when stowing DLU antenna into storage tube so as not to damage GPS antenna assembly.

WARNING
Do <u>not</u> step on LS cables or cable bundles to prevent injury.

16. Shuts down generator set.

    a. Climbs up to generator set platform.

    b. Opens control cubicle door.

    c. Sets START/RUN/STOP switch to STOP.

    d. Verifies engine stops.

    e. Pulls out DC CONTROL CIRCUIT BREAKER.

    f. Closes and latches control cubicle and air vent doors.

16. Continues verifying torque values.

CREW MEMBER 1	CREW MEMBER 2

g. Assist with verifying torque values.

CAUTION
After generator is off, set DEADCRANK switch to off position. If left in normal position battery will discharge.

WARNING
To prevent injury, do not step on LS cables or cable bundles.

CAUTION
Equipment damage can result if both lock pins are not completely installed.

WARNING
Keep fingers outside outrigger control box until the box is locked open. The cover snaps open and can injure fingers.

17. Shuts down generator set (TQG MEP 814).

a. Climbs up to generator set platform.

b. Opens access doors.

c. After 5 minutes of operation without a load applied, places MASTER switch to OFF position.

17. Continues verifying torque values.

CREW MEMBER 1	CREW MEMBER 2

d. Verifies engine stops.

e. Places DEADCRANK switch in OFF position.

f. Closes and latches access doors.

g. Assists with verifying torque values.

18. Assists and observes outrigger operations.

a. Proceeds to rear LS trailer and notifies CM 2 area is clear and safe for outrigger operation.

18. Raises outriggers.

a. At outrigger control box, opens and secures cover.

WARNING

<u>Prior</u> to operation, ensure personnel are clear of outriggers to prevent injuries.

b. Lifts red safety guard for POWER ON/OFF switch and sets to ON. Ensures power light is on.

Note: For unleveled sites, outriggers may have to be operated one at a time.

CAUTION

Ensure outriggers are free of debris. Do <u>not</u> use outrigger switches in diagonal pairs. To lower outriggers to the ground, use the corresponding single switch per outrigger.

CREW MEMBER 1	CREW MEMBER 2
	Notes: • Switch control outriggers as follows: Switches — Outriggers Right top and bottom — Two front Left top and bottom — Two rear Top two — Roadside Bottom two — Curbside • Use a single outrigger control switch, if one outrigger must be moved more than another.
CAUTION To prevent damage when raising outriggers, crew members must observe outrigger pads to ensure they have free movement and are free of obstruction all the way up to the stow position.	
c. Observes rear outriggers; notifies CM 2 to stop raising outriggers when outrigger pads are about 1 to 2 feet above the ground.	c. Coordinates with CM 1. In tandem, pulls up and holds two rear outrigger control switches until rear outriggers are 1 to 2 feet above ground and then stops.
d. Checks rear outrigger pads for free movement.	
e. Notifies CM 2 to continue raising rear outriggers to stow position.	e. Coordinate with CM 1. Uses front outrigger control switches to adjust height of semitrailer so semitrailer kingpin plate is aligned with tractor fifth wheel.
f. Places rear tire chock blocks and attaches rear outrigger safety chains. Notifies CM 2 when clear.	

CREW MEMBER 1	CREW MEMBER 2
g. Proceeds to roadside front of LS semitrailer and observes forward outrigger.	g. Coordinates with CM 1. Uses front outrigger control switches to adjust height of semitrailer so semitrailer kingpin plate is aligned with tractor fifth wheel ramp plate. h. Sets outrigger control POWER ON/OFF switch to OFF. Lowers safety guard.

DANGER

Do not permit anyone to stand directly behind tractor or semitrailer during coupling procedure. Death to personnel can result.

19. Couples LS tractor to semitrailer.	19. Couples LS tractor to semitrailer.

CAUTION

Remove mud flaps from tractor, if installed. Damage to mud flaps or outrigger control box can occur if left installed during road march.

a. Removes mud flaps from tractor, if installed. b. Enters tractor cab and pushes in PARKING BRAKE control knob.	a. Assists CM 1 with removal of mud flaps. b. Removes tractor wheel chocks, curbside and roadside. Verifies primary and secondary locks of fifth wheel.

CAUTION

Do not run kingpin up guide ramps or into throat of the fifth wheel. Damage to kingpin guide ramps or fifth wheel may result. Ensure cables and hoses are clear of the fifth wheel.

CREW MEMBER 1	CREW MEMBER 2
c. Maneuvers LS tractor back under semitrailer. Stops when signaled by CM 2.	c. Proceeds to roadside front of semitrailer. Using hand signals, guides tractor slowly back under semitrailer so kingpin is aligned with throat of fifth wheel. Signals CM 1 to stop.
Note: During tractor and semitrailer coupling operations, tractor operator should hold TRAILER HAND BRAKE control in ON position to apply semitrailer brakes.	**Note**: Check that kingpin is in fifth wheel throat. Daylight should not be seen between top of fifth wheel and bottom of semitrailer.
d. Continues to slowly back tractor after picking up semitrailer and after fifth wheel jaws lock around kingpin. Stops when signaled by CM 2.	d. Slowly guides tractor back until fifth wheel coupling jaws are engaged around semitrailer kingpin. Primary and secondary lock handles shift into locked (in) position; signals CM 1 to stop.
e. Sets parking brake and places shift lever to NEUTRAL. Leaves engine running. Notifies CM 2 to chock wheels.	e. When notified by CM 1, chocks tractor wheels (roadside and curbside).
f. When notified by CM 2 chocks are emplaced, exits vehicle.	f. Notifies CM 1 that chocks are emplaced.
20. Observes front roadside outrigger; notifies CM 2 when outrigger is just clear of the ground.	20. Raises front outriggers.
a. Verifies fifth wheel primary and secondary lock handles are in the locked position.	a. At outrigger control box, lifts red safety guard for POWER ON/OFF switch; sets to ON. Ensures power light is on.
b. Assists CM 2.	b. In tandem, pulls up and holds front outrigger control switches.
c. Signals CM 2 to raise outriggers just clear of the ground.	c. Raises front outriggers until just clear of the ground.
	d. Turns off power at the outrigger control panel.
21. Performs tractor and semitrailer jerk test.	21. Performs tractor and semitrailer jerk test.
a. Returns to cab of tractor. Ensures AIR PRESS gauge indicates at least 100 psi (690 kPa).	a. Removes tractor wheel chocks (curbside and roadside).

CREW MEMBER 1	CREW MEMBER 2
b. When notified by CM 2 that LS is ready for jerk test, inches tractor forward to check coupling.	b. Notifies CM 1 that LS is ready for jerk test. Has CM 1 check coupling by inching tractor forward. If secure, stops. Note: If coupling is not secure, have CM 1 slowly rock tractor back and forth until kingpin is securely locked in fifth wheel.
c. Sets parking brake and places shift lever to NEUTRAL. Leaves engine running. Notifies CM 2 to chock wheels.	c. When notified by CM 1, chocks tractor wheels.
d. When notified by CM 2 that chocks are emplaced, exits vehicle.	d. When notified by CM 1, chocks tractor wheels (roadside and curbside). Notifies CM 1 that chocks are emplaced.
e. Verifies fifth wheel primary and secondary lock handles are in lock position.	

CAUTION

To prevent equipment damage when raising outriggers, crew members must observe outrigger pads to ensure they have free movement and are free of obstruction all the way up to the stow position.

22. Stows front outriggers.	22. Stows front outriggers.
a. Observes front outrigger. Ensures area is clear and notifies CM 2.	a. When notified by CM 1 that front roadside area is clear, turns power on at the outrigger control panel.
b. Notifies CM 2 to stop raising outriggers, when outrigger pad is about 1 to 2 feet above the ground.	b. At outrigger control panel, in tandem, pulls up and holds front outrigger control switches until front outriggers are 1 to 2 feet above ground, and then stops.
c. Checks outrigger pad for free movement; notifies CM 2 to continue raising outriggers to stow position.	c. Checks curbside outrigger pad for free movement. When notified by CM 1, continues to raise outriggers to stow position.

CREW MEMBER 1	CREW MEMBER 2
	d. Sets POWER ON/OFF switch to OFF; closes and secures cover.
CAUTION Ensure outrigger safety chains are connected prior to road travel to prevent injury to personnel and equipment.	
e. Connects roadside front outrigger safety chain.	e. Connects curbside front outrigger safety chain.
23. Disconnects and stows ground cable.	23. Assists CM 1 with disconnecting and stowing ground cable.
24. Assists CM 2 with removing ground rods.	**24. Removes as many sections of ground rods as terrain and time permit. Stows any ground rods removed.**
25. Prepares for road march.	25. Prepares for road march.
a. Enters tractor cab.	a. Retrieves and stows roadside fire extinguisher and chocks.
b. Establishes communications and informs the ECS or convoy commander that LS is ready for road march.	b. Checks front tractor lights.
	c. Retrieves and stows curbside fire extinguisher and chocks.
d. Performs rear trailer light test.	d. Checks rear trailer lights.
e. Moves tractor slowly forward and stops to check brakes.	e. Assists as needed.
Note: For evaluation purpose, time stops here.	
f. Waits for orders to move; moves on command.	f. Enters tractor or ground guides as needed.

COACHING POINT: The performance measures are completed in the sequence outlined. All crew members do their like-numbered performance measures at the same time. When all the performance measures have been mastered and all crew members can do their jobs without coaching, go for speed and remember to be safety-conscious. The more the drill is performed, the better the crew members will perform together.

RUN-THROUGH INSTRUCTIONS: The crew members should practice this drill until they can perform the drill according to the standard without using the drill book. The initial run-through should be conducted slowly. The crew members should change positions in order to learn all steps and standards.

PERFORM: When the crew members can perform this crew drill to standards, inform the platoon sergeant or platoon leader that the crew members are ready to be evaluated.

SUPPORTED T&EOS

ARTEP NUMBER	T&EO NUMBER	T&EO TASK TITLE
44-637-30-MTP	44-2-9044	Perform March Order
44-637-30-MTP	55-2-C324	Conduct a Convoy

APPENDIX A

INDIVIDUAL TASK-TO-DRILL MATRIX

The following matrix identifies individual tasks from STP 44-14T14-SM-TG, which support each LS and Missile Reload crew drill. Individual tasks, which support a drill, are indicated by a "B" or a "D" in the column below the drill. A "B" indicates tasks that are trained prior to the drill, and a "D" indicates tasks that are trained during the drill. Skill levels 1, 2 and, 3 tasks are shown for these drills.

	Crew Drill Number and Title		
Individual Task Number and Soldier Manual Task Title	44-5-D013 Emplace the LS for Tactical Operations	44-5-D014 Prepare the LS for Road March	44-5-D015 Perform Missile Reload Procedures
441-082-1100 Perform LS Emplacement	D		
441-082-1102 Perform LS March Order		D	
441-082-1104 Perform Operator PMCS/Corrective Maintenance on GMC			D
441-082-1105 Perform Operator/Organizational PMCS on the LS			B
441-082-1106 Load a GMC Onto the GMT			D
441-082-1107 Load a GMC Onto the LS			D
441-082-1108 Remove a GMC From the LS			D

Individual Task Number and Soldier Manual Task Title	Crew Drill Number and Title		
	44-5-D013 Emplace the LS for Tactical Operations	44-5-D014 Prepare the LS for Road March	44-5-D015 Perform Missile Reload Procedures
441-082-1109 Remove a GMC From the GMT			D
441-084-1108 Operate the HEMTT Series Vehicle	B	B	B
441-082-1110 Perform Operator/Organizational Maintenance on the LSDU	B	B	B
441-084-1111 Operate Crane Mounted on a 10-Ton Vehicle			B
441-084-1112 Signal Crane Operator Using Standard Arm-and-Hand Signals			B
441-082-2054 Supervise LS Emplacement	D		
441-082-2055 Supervise LS March Order		D	
441-084-3026 Supervise Road March Procedures		D	
441-082-2056 Supervise PMCS/Corrective Maintenance on the GMC			D

Individual Task Number and Soldier Manual Task Title	Crew Drill Number and Title		
	44-5-D013 Emplace the LS for Tactical Operations	44-5-D014 Prepare the LS for Road March	44-5-D015 Perform Missile Reload Procedures
441-082-3028 Supervise Missile Reload			D
441-082-3029 Supervise Operator/Organizational PMCS on Launching Section Equipment	B	B	B

Individual Task Number and Soldier Manual Task Title	Crew Drill Number and Title	
	44-5-D019 Emplace the PAC-3 LS for Tactical Operations	44-5-D020 Prepare the PAC-3 LS for Road March
441-082-1100 Perform LS Emplacement	D	
441-082-1102 Perform LS March Order		D
441-082-1104 Perform Operator PMCS/Corrective Maintenance on GMC	D	

	Crew Drill Number and Title	
Individual Task Number and Soldier Manual Task Title	44-5-D019 Emplace the PAC-3 LS for Tactical Operations	44-5-D020 Prepare the PAC-3 LS for Road March
441-084-1108 Operate the HEMTT Series Vehicle	B	B
441-082-1110 Perform Operator/Organizational Maintenance on the LSDU	B	B
441-082-2054 Supervise LS Emplacement	D	
441-082-2055 Supervise LS March Order		D
441-084-3026 Supervise Road March Procedures		D
441-082-2056 Supervise PMCS/Corrective Maintenance on the GMC	D	
441-082-3028 Supervise Missile Reload	D	
441-082-3029 Supervise Operator/Organizational PMCS on Launching Section Equipment	B	

APPENDIX B

ICOM RADIO FULL LOAD START PROCEDURES

Note: The following procedures are performed by CM 2 if radio has been powered down for more than 24 hours, or FCTN switch was set to OFF or Z-H. Perform if frequency hopset, COMSEC codes, or TOD SYNC time need to be loaded into radio AN/VRC-90A.

ICOM RADIO

1. Set FCTN to OFF.
2. Set COMSEC to Z.
3. Set CB1 to OFF.
4. Disconnect W15P2 from AUDIO/DATA.
5. Disconnect W13P1 from J1 ANT.
6. Set CB1 to ON.
7. et FCTN to SQ ON.
8 Set MODE to FH.
9. Set CHAN to MAN.
10. Set COMSEC to CT.
11. Set RF PWR to M.
12. Set DIM fully clockwise.
13. Set DATA RATE to OFF.
    a. Press DATA key.
    b. Press CHG key until OFF is displayed.

14. Connect handset to the AUD/DATA connector.
15. Press the PUSH-TO-TALK switch until a steady tone is heard in the handset.
16. Set FCTN to TST; GOOD is displayed.
17. Set FCTN to Z-FH; GOOD is displayed.
18. Set FCTN to LD.

ANCD

19. Press ON/OFF key.
20. When "select: Soi Radio supervisor" display appears, press "R" key to select Radio.
21. When "Send Receive Database setup Comsec Time" appears, press ENTER key to select Send.
22. When "send to: Radio ANCD Stu Pc" appears, press ENTER key to select Radio.
23. When "select: iCom Nonicom Abn Rcu Haveq" appears, press ENTER key to select iCom.
24. Connect W4 cable to fill-port connector.

ICOM RADIO

25. When instructed by ANCD display, connect other end of W4 cable to AUD/FILL.

ANCD

26. Press DOWN ARROW key.

ICOM RADIO

27. When instructed by ANCD, set FCTN to LD.

ANCD

28. Press DOWN ARROW key.

29. When “Do you want to include time? ” Y/N appears, press ENTER key to select yes.

ICOM RADIO

30. When “Press [LOAD] on RT” appears on ANCD, press ICOM LOAD key; LOAD appears on ICOM display.

ANCD

31. Observe data transfer messages on the ANCD display. When down-load is complete, “Transfer successful” message will be displayed.

32. Press ON/OFF key; observe “Shutdown in Progress” message appears.

ICOM RADIO

33. Disconnect W4 cable from AUD/FILL.

VERIFY ICOM RADIO FREQUENCY HOPSETS ARE LOADED

34. Set FCTN to SQ ON.

35. Set CHAN to 1.

36. If F(n)(n)(n) is displayed, hopset transfer into selected CHAN was successful.

37. If F(n)(n)(n) is NOT displayed, hopset transfer into selected CHAN was NOT successful; return to step 1 and repeat procedure.

VERIFY TIME-OF-DAY

ANCD

38. Press ON/OFF key.
39. When “select: Soi Radio supervisor” display appears, press R to select Radio.
40. When “Send Receive Database setup Comsec Time” appears, press “T” key to select Time; observe that Time display appears.

ICOM RADIO

41. Press TIME key.
42. Compare ICOM radio Julian date with ANCD Julian date. If they are not the same, return to step 1 and repeat procedure.

ANCD

43. Press DOWN ARROW key.

ICOM RADIO

44. Press TIME key a second time.
45. Compare ICOM radio hours and minutes with PLGR hours and minutes. If they are not the same, return to step 1 and repeat procedure.
46. Press TIME key a third time.
47. Compare ICOM radio minutes and seconds with PLGR minutes and seconds; ICOM radio time is within ±55 seconds of PLGR time.
48. If not correct, return to step 1 and repeat procedure.
49. Press ON/OFF key; observe “Shutdown in Progress” message appears.

VERIFY COMSEC CODE IS LOADED

ICOM RADIO

50. Connect handset to AUD/DATA connector.

51. Set CHAN to position designated for your FP.

52. Set COMSEC to CT.

53. Connect cable W13P1 to J1 ANT.

54. Listen to handset.

Note: If no sound is heard in the handset, depress and release the PRESS-TO-TALK switch several times and verify that a beep is heard after each press. If a beep is heard after each press, the COMSEC code is loaded. Go to step 55. If a beep is not heard after each press, the COMSEC code is NOT loaded. Return to Step 1 and repeat the procedure. If a steady beeping is heard in the handset, the COMSEC code is NOT loaded. Return to Step 1 and repeat the procedure.

55. Disconnect handset from AUD/DATA connector.

RETURN RADIO TO OPERATION

Note**:** If radio silence is required, perform step 56. If radio silence is not required, go to step 57.

56. Set FCTN to STBY.

57. Reconnect W13P1 to J1 ANT.

58. Reconnect W152P2 to AUD/DATA.

Note: Proceed to step 59 when radio silence is no longer required.

59. Set FCTN to SQ ON.

60. Set CHAN to position designated for your FP; F(n)(n)(n) is displayed.

61. Set RF PWR per battalion communications plan.

62. Set data rate to 16000.

CHANGE DATA NET ID

Note: A different data net ID is necessary to prevent VHF voice and VHF data interference. The operator must know the data net ID assigned to the FP or must know how to retrieve this data from the ANCD SOI program.

63. Set FCTN to LD.

64. Set CHAN to position where data net ID to be changed is stored.

65. Press FREQ key. F(n)(n)(n) appears.

66. Press CLR key. F_ _ _ is displayed.

67. If CLR___ is displayed, press FREQ key; F(n)(n)(n) is displayed. Repeat step 66. Enter three digits of the assigned data net ID.

68. Press STO key. The newly assigned data net ID will blink, indicating that it is stored and operational.

69. Set FCTN to SQ ON.

70. (ECS ONLY) Press digital processor COMPUTER RESET button. After 5 seconds, verify that no MODULE FAULT indicators are lit and that ECS DLU-DP is displayed on the front panel.

LATE NET ENTRY AT LAUNCHING STATION

71. Set CHAN to position designated for your FP.

72. Press FREQ key. F(n)(n)(n) is displayed.

73. Press SYNC key. LF(n)(n)(n) is displayed. The “L” will disappear when ECS and LS are synchronized.

74. After the ECS and LS are synchronized, press digital processor COMPUTER RESTART button. Wait approximately 15 seconds to ensure that all MODULE FAULT indicators are not illuminated. LS DLU-DP BANK (A-F), ADDRESS (1-8) is displayed on the front panel.

APPENDIX C

LOAD PROCEDURES FOR PLGR USING ANCD

Note: The following procedures are performed by CM 1 when determined that the CRYPTO codes are not loaded.

Transfer crypto keys from the automated net control device to the precision lightweight GPS receiver.

Note: The PLGR must be on, self-test passed, and a position screen displayed prior to performing this procedure.

PLGR

1. Remove PLGR from the protective storage box. Ensure that all cables are still connected after removal.
2. Remove rubber protective cover from J1 connector.
3. Connect W4 cable to J1 connector. The other cable end will be connected later in this procedure.

ANCD

4. Press ON/OFF key.
5. When “select": Soi Radio supervisor” appears, press “R” key to select Radio option.
6. When “Send Receive Database setup Comsec Time” appears, press “C” key to select Comsec option.
7. When “vG Ld Rv Ak Mk U” appears, press “L” key to select Ld option.
8. When “select: Tek Kek” appears, press “T” key to select Tek option.

Note: In the next step, the operator must know the PLGR key name that was assigned by higher echelon.

9. When “Select key qUit” appears, press P DN (Page Down) key until the PLGR key name is displayed.
10. Press ENTER key. “XMT” appears on the display.
11. Press “U” key to select qUit option.

Note: In the next step, the crypto key is immediately transferred when the W4 cable is connected. Observe the PLGR and ANCD displays when connecting cable.

12. When “Connect ANCD to RT” appears, press DOWN ARROW key **first** and then connect W4 cable to ANCD. “One key transferred” is displayed on ANCD and “Key loaded” is momentarily displayed on PLGR.

13. Disconnect W4 cable from ANCD.

14. Press ON/OFF key.

PLGR

15. Disconnect W4 cable.

16. Install J1 connector protective cover.

17. Check to ensure that all cables are connected before reinstalling PLGR back into the protective storage box.

APPENDIX D

FIBER-OPTIC CABLE ASSEMBLY PROCEDURES

SECTION I. FIBER-OPTIC CABLE ASSEMBLY EMPLACEMENT

The crew members listed below complete their performance measures as they are stated and in the sequence shown. They synchronize the completion of like-numbered performance measures.

WARNING

Infrared signals that can cause eye damage are present in data link terminal equipment. Do not look into exposed jacks or disconnected fiber-optic cable assemblies.

WARNING

Handle FOCA carefully. Wear gloves to avoid hand injury.

Notes:

- The data link system between the ECS and LSs has the additional capability of using fiber-optic cables for data communications. Use of the fiber-optic cable assembly will be determined according to local command directives.
- Because of the configuration options available when using the FOCA, local command directives will determine the type of configuration to be used.
- The following procedures provide a method for employment of the FOCA. Because of the various possible methods of employing the FOCA, these procedures provide broad guidance for the crew and are written in general terms to allow for a tactical situation input.
- The FOCA reel, A5W34, contains 300 meters of FOC. There are four reels stored in the curbside storage box of each LS. Also stored in the curbside storage box is a reel unit, RL-31-E. It consists of a divided axle, brake unit, shoulder-carrying straps, and reel unit frame.
- The NATO adapter cable stored in the curbside storage box is used for reconstitution of forces.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3

CAUTION

Curbside storage box access cover is heavy. Two people are required to open or close access door to avoid injury.

Note: Two personnel are required to remove FOCA equipment from storage box. Three personnel are required to lay fiber optic cable assembly beginning with step 3. CM 3 will be either the launcher crew chief or his assistant.

1. Prepares fiber-optic cable equipment for use.	1. Assists CM 1 prepare FOCA equipment.
a. Determines the distance in meters between the LS and ECS, or LS to LS.	
b. Assisted by CM 2, opens curbside storage box.	b. Assists CM 1 open curbside storage box.
c. Removes required number of FOCA reels to reach ECS or LS. Places reels on the ground, forward of LS forward curbside outrigger, with sides upright.	c. Assists CM 1 remove FOCA equipment.

Note**:** If more than one FOCA reel is required, place two reels side by side so that side axle holes are aligned.

d. Removes frame, divided axle, crank handle, and shoulder-carrying straps as required.	
e. If required, removes adapter cable.	
f. Closes and secures roadside storage box.	f. Assists CM 1.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
2. Sets up reel unit frame with the FOCA reel(s) at forward of front curbside outrigger. a. Opens up the reel unit frame. b. Lifts reel unit frame over the FOCA reel(s). Places FOCA reel into frame. c. Aligns bearing blocks on frame with axle holes of FOCA reel(s). Slides the divided axle through the axle hole in the reel. d. On divided axle, turns axle stops one-fourth turn. e. On reel unit frame, opens each bearing block. f. Raises reel unit frame to engage bearings and divided axle. g. Closes bearing caps and secures bearing latches. h. Mounts crank handle on divided axle closest to the FOCA reels.	2. Assists CM 1.	

CAUTION

FOCA may be damaged if emplaced within the missile blast area. During FOCA emplacement, ensure FOCA is a minimum of 20 meters away from any point of the LS aft of the forward outriggers.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3

CAUTION

Moisture and dirt on internal surfaces of FOCA connectors adversely affect data transmission. Ensure internal surfaces of connectors remain free of moisture and dirt when making connection.

WARNING

Reel unit frame assembly with reel(s) is heavy. Two crew members must lift and carry to avoid personal injury and possible damage to equipment.

3. Connects shoulder-carrying straps to frame and lifts frame.	3. Connects shoulder-carrying straps to frame and assists CM 1.	3. Lays out FOCA.
a. Loops straps over shoulders and behind neck, and adjusts for length.	a. Loops straps over shoulders and behind neck, and adjusts for length.	a. Passes the FOCA under curbside outrigger.
b. Connects straps to frame legs.	b. Connects straps to frame legs.	b. Lays enough FOCA to reach the DLTM.

Note: Ensure FOCA is a minimum of 20 meters away from the LS after clearing forward outrigger.

c. Together with CM 2, lifts reel unit frame and carefully walks forward, maintaining a 20-meter distance from blast area.	c. Together with CM 1, lifts reel unit frame and carefully walks forward, maintaining a 20-meter distance from blast area.	c. Assists CM 1 and CM 2 lay out the FOCA, using hand crank.

Note: Ensure FOCA is being laid properly and safely.

4. Lays FOCA to ECS or LS.	4. Lays FOCA to ECS or LS.	4. Lays FOCA to ECS or LS.
a. Walks to ECS or LS.	a. Walks to ECS or LS.	a. Walks to ECS or LS.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
Note: If more than one reel is required, perform necessary procedures to connect additional reels. When laying FOCA to the ECS, approach the ECS along the roadside.		
b. At ECS or LS, places reel unit frame on the ground close to the ECS or LS fiber-optic connector panel.	b. At ECS or LS, places reel unit frame on the ground close to the ECS or LS fiber-optic connector panel.	
c. Removes crank from end of divided axle.	c. Removes crank from end of divided axle.	
d. Opens bearing blocks and rests the reel unit frame on the ground.	d. Opens bearing blocks and rests the reel unit frame on the ground.	
e. Removes divided axle from FOCA reel(s).	e. Removes divided axle from FOCA reel(s).	Note: If connecting FOCA to ECS, use step 5. If connecting FOCA to LS, use step 6.
5. Returns to LS and stow FOCA equipment.	5. Returns to LS and stow FOCA equipment.	5. Connects FOCA to ECS. Note: ECS fiber-optic connector panels J1 through J8 provide parallel data communications to all connected launchers from the ECS master buss unit A102.
a. Assisted by CM 2, carries FOCA equipment to LS and stows.	a. Assists CM 1 carry and stow FOCA equipment.	a. Removes protective cap from assigned jack (J1 through J8) at fiber-optic connector panel.

CAUTION

Curbside storage box access cover is heavy. Two people are required to open or close access door to avoid injury.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
b. Assisted by CM 2, closes curbside storage box. Secures.	b. Assists CM 1 close curbside storage box.	b. Removes protective cap from FOCA connector. Note: Ensure internal surfaces of caps and connectors remain free of moisture and dirt. c. Connects the FOCA connector to assigned jack (J1 through J8); turns clockwise to secure. d. Connects protective caps together. e. Notifies CM 2 FOCA is connected to the ECS. Note: Before connecting FOCA to LS, lay FOCA over the top and to the rear of the curbside storage box.
6. Connects FOCA to DLTM. a. Removes protective cap from J8 at DLTM. b. Removes protective cap from FOCA.	6. At DLTM slave buss unit A2A7, opens and lowers cover.	6. Connects FOCA to LS. a. Removes protective cap from J9 at DLTM. b. Removes protective cap from FOCA.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
Note: Ensure internal surfaces of caps and connectors remain free of moisture and dirt.		Note: Ensure internal surfaces of caps and connectors remain free of moisture and dirt.
c. Connects FOCA to J8.		c. Connects FOCA to J9.
d. Connects protective covers together.	d. Connects protective covers together.	
e. Notifies LS CM 2 to power up the slave buss unit.	e. Powers up the slave buss unit.	e. Notifies CM 2 that the FOCA is connected to the LS.
	(1) Ensures 2S41 is in the ON position.	
	(2) Ensures 2S1 is set to OP.	
	(3) Verifies GO indicator is on.	
	f. Closes SBU cover.	

Note: Repeat this procedure for each LS for FOCA emplacement. Return to Crew Drill 44-5-D013 and prepare the LS for action.

SECTION II. FIBER-OPTIC CABLE ASSEMBLY MARCH ORDER

The crew members listed below complete their performance measures as they are stated and in the sequence shown. They synchronize the completion of like-numbered performance measures.

WARNING

Infrared signals that can cause eye damage are present in data link terminal equipment. Do not look into exposed jacks or disconnected FOCAs.

WARNING

Handle FOCA carefully. Wear gloves to avoid hand injury.

Note: Because of the configuration options available when using the FOCA, local command directives will determine the type of march order configuration to be used. The following procedures provide a method for march order of the FOCA. Because of the various possible methods to march order the FOCA, these procedures provide broad guidance for the crew and are written in general terms to allow for a tactical situation input.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
	1. Powers down DLTM slave buss unit. Notifies CM 1.	
2. Disconnects FOCA and removes FOCA equipment from LS curbside storage box.	2. Assists CM 1 with FOCA equipment.	
a. When notified that the slave buss unit is powered down, disconnects FOCA from DLTM.		
b. Disconnects FOCA from J9, if connected.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3

c. Installs protective caps and plugs.

CAUTION
Curbside storage box access cover is heavy. Two people are required to open or close access door to avoid injury.

d. Assisted by CM 2, opens curbside storage box.

e. Removes required equipment to recover FOCA.

(1) Reel frame unit.

(2) Divided axle.

(3) Required number of FOCA reels.

(4) Hand crank(s).

(5) Shoulder straps.

Note: A cable reel may have been left at a distant LS or at the ECS for march order of the FOCA. (This note is confusing. What is it telling the soldier?)

3. Assisted by CM 2, assembles reel unit frame.

3. Assists CM 1 with assembly of reel unit.

WARNING
If reel unit tips over, it can injure personnel. Ensure reel unit is installed on level ground.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3

Note: If more than one FOCA reel is required, place two reels side by side so that the axle holes line up with each other.

a. Sets up reel unit frame.

b. Places required number of FOCA reels on the ground next to each other, with sides upright.

c. Slides divided axle through axle hole in FOCA reel(s).

d. On divided axle, turns axle stops one-fourth turn.

e. On reel unit frame, opens each bearing block.

f. Lifts over the FOCA reel(s) or places FOCA reel(s) into reel unit frame. Engages frame and axle.

g. Closes bearing caps and secures bearing latches.

h. Mounts crank handle on the divided axle closest to the FOCA reel(s).

i. Assisted by CM 2, prepares the reel unit frame for use.

(1) Obtains reel unit shoulder straps.

(2) Loops straps over shoulders and behind neck, and adjusts for length.

i. Assists CM 1 in preparing the reel unit frame for use.

(1) Obtains reel unit shoulder straps.

(2) Loops straps over shoulders and behind neck, and adjusts for length.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
(3) Connects straps to the frame legs.	(3) Connects straps to the frame legs.	
j. Together with CM 2, lifts reel unit frame and carefully walks forward to the ECS or LS.	j. Together with CM 1, lifts reel unit frame and carefully walks forward to the ECS or LS.	

Note: Depending upon unit operations, you may start FOCA recovery at the LS (step 4) or at the ECS (step 5).

4. Assisted by CM 2, recovers FOCA from distant LS.	4. Assists CM 1 recover FOCA.	
a. Disconnects FOCA protective caps from each other.		

CAUTION

Moisture and dirt on internal surfaces of FOCA connectors adversely affect data transmission. Ensure internal surface of connectors is free of moisture and dirt when installing protective caps.

b. Disconnects FOCA from DLTM.		
c. Installs protective cap on FOCA connector, and lays cable down.		
d. Installs protective cap on the DLTM FOCA connector.		
e. Secures FOCA connector and 15 feet of the cable inside reel.		

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3

Note: After disconnecting FOCA(s) from LS, proceed to step 6.

5. Assisted by CM 2, recovers FOCA from ECS.

5. Assists CM 1 recover FOCA.

a. Disconnects FOCA protective caps from each other.

CAUTION

Moisture and dirt on internal surfaces of FOCA connectors adversely affect data transmission. Ensure internal surface of connectors is free of moisture and dirt when installing protective caps.

b. Disconnects the assigned FOCA from the ECS connector panel.

c. Installs protective cap on FOCA connector and lays cable down.

d. Installs protective cap on the ECS FOCA connector.

e. Secures FOCA connector and 15 feet of the cable inside reel.

Note: The remaining steps require three people to march order FOCA.

6. Recovers the FOCA.

6. Recovers the FOCA.

6. Recovers the FOCA.

Note: FOCA should be drawn over top of the reel and guided so that it is wound in level layers on the reel. If more than one reel is required to recover FOCA, perform same procedures for each additional reel. FOCA should be wiped clean of dirt and moisture during recovery.

CREW MEMBER 1	CREW MEMBER 2	CREW MEMBER 3
a. Together with CM 2, lifts reel unit frame and carefully walks to the LS to stow and secure equipment.	a. Together with CM 1, lifts reel unit frame and carefully walks to the LS to stow and secure equipment.	a. Assists CMs 1 and 2 recover FOCA. b. Using hand crank, ensures the FOCA is secure on reel. c. Returns to duties.
7. Assisted by CM 2, stows and secures FOCA equipment. a. Removes crank from end of divided axle, and opens bearing latches. b. Disassembles FOCA equipment for storage. c. Folds reel unit frame together. d. Assisted by CM 2, stows FOCA equipment. Closes and locks storage box.	7. Assists CM 1 in stowing and securing FOCA equipment.	

APPENDIX E

MANUAL EMPLACEMENT USING M2 AIMING CIRCLE AND M1 GUNNER'S QUADRANT PROCEDURES

Note: Units not equipped with AEE equipment will perform the following procedures using the M2 aiming circle and M1 gunner's quadrant. The M2 aiming circle and M1 gunner's quadrant are used for backup to the automatic emplacement procedure in the event the PLGR/GPS is nonoperational or nonfunctional. For aligning LS at an unsurveyed site, perform the procedures in TM 9-1440-600-10, paragraph 2-53. For aligning LS at a surveyed site, perform steps 1 through 9 below.

CAUTION
Rotate aiming circle in a clockwise direction to reduce gear backlash.

CAUTION
With the fiber-optic cable modification installed, curbside stowage box is heavy. Two people are required to open or close access door, to avoid injury.

CREW MEMBER 1	CREW MEMBER 2
1. Obtains alignment equipment. a. Assisted by CM 2, opens curbside storage box and removes the aiming circle. b. Opens rear stowage container and removes the tripod. c. Takes M2 aiming circle and tripod to the M2 stake directly behind LS. 2. Sets up the LS M2 aiming circle with tripod.	1. Assists CM 1 with opening the curbside storage box.

CREW MEMBER 1	CREW MEMBER 2

a. Sets up tripod: loosens leg wing screws, extends legs for convenient length, and tightens wing screws.

b. Sets tripod upright and adjusts legs. Legs should be about 45 degrees apart. Adjusts as needed.

c. Places tripod over LS M2 stake; hangs plumb bob so it is about 1 inch above stake.

d. Firmly embeds the tripod legs, ensuring plumb bob is ½ inch above stake and tripod head is approximately level.

e. Removes tripod head cover. Secures M2 instrument to tripod, ensuring plumb bob is centered on stake.

Note: If lighting is limited, install instrument light in eyepiece slot.

3. Levels the M2 aiming circle.

a. Loosens three leveling screws to expose about ¼ inch of thread.

b. Simultaneously turns two screws in opposite directions, or the third screw only, until the bubble in the circular level is centered.

c. Using the azimuth micrometer, releases azimuth main body and rotates the instrument until the horizontal level is parallel to any two leveling screws.

d. Simultaneously turns the parallel screws in opposite directions to center the bubble in the tubular leveling vial.

e. Rotates telescope 1/3 turn; uses third leveling screw to center bubble.

CREW MEMBER 1	CREW MEMBER 2

f. Rotates telescope another 1600 mils cw. Using the first two leveling screws, centers bubble.

g. Repeats until bubble remains centered.

h. Rotates telescope 3200 mils from first position; rotates 3200 mils from second position. If bubble does not move more than one graduation in each position, the M2 is level.

Note: If bubble moved more than one graduation, adjust bubble halfway to center when telescope is 3200 mils from first and second positions. Check all positions: if out more than one graduation, turn instrument in for repair.

Note: The LS will be elevated and rotated to promote settling and to ensure that all outrigger pads are firmly on the ground. Before continuing, verify that both travel lockpins are removed and stowed.

WARNING

Ensure that <u>all</u> personnel are clear of LS trailer <u>prior</u> to elevating and rotating the platform.

4. Orients on LS position stake.

a. Sets LS M2 azimuth to azimuth on tag of LS M2 stake, using upper (recording) motion.

(1) Uncovers lower (nonrecording) knobs; rotates telescope to point toward LS stake.

(2) Centers the telescope cross lines on the base of the LS stake.

(3) Closes lower (nonrecording) knob covers.

4. Assists CM 1 as required.

CREW MEMBER 1	CREW MEMBER 2
(4) Checks azimuth above is still correct. b. Has CM 2 verify aiming circle alignment and azimuth scale settings.	
5. Measures the true azimuth of LS. a. When the launcher is erected, sets sight on the inside of right hand canister pins (for standardization), using the upper (recording) motion and the elevation knob.	5. Assists CM 1 as required.

WARNING

Do <u>not</u> place Engagement Control Handle in elevate while performing this step on a PAC-3 LS; doing so will not allow manual rotation of the LS. Extra caution <u>must</u> be used when performing this step, as there is no MCU circuit breaker to turn off on the PAC-3 LS.

Note: If not possible to align on alignment pins, perform the following:

(1) Has CM 2 set MOT CONT UNIT AC switch on LEM-PDU to OFF. (2) Has CM 2 manually rotate the launcher. (3) Observes CM 1 rotate M2, using upper (recording) motion; rotates until the pins align with the telescope cross lines. (4) Notifies CM 2 to stop manual rotation and to set MOT CONT UNIT AC switch to ON (if applicable).	(1) When notified by CM 1, at LEM-PDU, sets MOT CONT UNIT AC to OFF. (2) Manually rotates the launcher left or right until alignment can be performed. (4) When notified by CM 1 to stop, sets MOT CONT UNIT AC to ON (if applicable).
b. Has CM 2 verify aiming circle alignment on alignment pins. c. Records true azimuth of LS canister pins on Launcher Location/Alignment Data Form.	b. Assists CM 1 verify alignment data.

CREW MEMBER 1	CREW MEMBER 2
d. Records the UTM coordinates, altitude, and orienting azimuth from tag on LS M2 stake on the Launcher Location/Alignment Data Form.	
e. On the Launcher Location/Alignment Data Form, subtracts the true azimuth of LS from 6400 mils and enters answer in BRNG LS to NREF.	
f. Enters the missile umbilical connected on the Launcher/Alignment Data Form.	
6. Assists CM 2 check the true azimuth of LS.	6. Checks the true azimuth of LS.
Note: If azimuth setting is not within 0.5 mils, repeat step 5.	
	a. Rotates telescope, using upper (recording) motion, to align telescope cross lines on base of the LS stake. Verifies azimuth setting is within 0.5 mils of orienting azimuth on Launcher Location/Alignment Data Form.
	b. Rotate telescope, using the upper (recording) motion to align on the same inside canister pins used by CM 1 in step 6. Verify the entry on the Launcher/Alignment Data Form.
7. Stows M2 aiming circle.	7. Determines LS attitude.
a. Ensures magnetic needle is locked.	a. From curbside storage box, removes gunner's quadrant from its case.
b. Covers tubular level vials.	b. Sets MCU circuit breaker to OFF (PAC-3 LS set Engagement Control Handle to elevate).
c. Ensures caps of orienting knobs are closed.	c. Goes to alignment datum on the turntable at the rear roadside of LS.

CREW MEMBER 1	CREW MEMBER 2
d. Places azimuth knob over notation pad, with azimuth micrometer to 0 mils.	d. Sets gunner’s quadrant radial arm and micrometer dial to the BLACK 0 LINE.
e. Unhooks plumb bob; places in accessory case.	
f. Sets elevation scale to 3 mils and elevation micrometer to 0 mils.	
g. Turns leveling screws ccw to their stops. Replaces instrument cover and latch cover.	
h. Removes instrument from tripod and replaces tripod head cover.	
i. Collapses tripod legs and tightens wing screws. Straps legs together.	
j. Returns tripod to rear curbside storage tube container. Returns aiming circle to curbside storage box.	
8. Assists CM 2 with checking the LS roll angle data.	8. Measures the LS roll angle as follows: a. Sets the gunner's quadrant down squarely on the two bolt heads that line up with the width of the semitrailer. b. Centers bubble in the level indicator. (1) Uses radial arm plunger for coarse adjustment. (2) Uses micrometer knob for fine adjustment. Note: If the bubble does not center, reverse the gunner's quadrant end-for-end and center the bubble. c. Reads roll angle to nearest 0.1 mil as follows: (1) Adds the number indicated on the main scale to the number indicated on the micrometer scale.

CREW MEMBER 1	CREW MEMBER 2
	(2) Determines the sign by the direction of arrow at base of quadrant.
	(a) If arrow points curbside, the sign is plus (+).
	(b) If arrow points roadside, the sign is minus (-).
d. When notified by CM 2, verifies roll angle data.	d. Notifies CM 1 to verify roll angle data.
	e. Records the sum of the coarse and micrometer scale and the sign as the roll angle on the Launcher Location/Alignment Data Form.
9. Assists CM 2 with checking the LS cross roll angle data.	9. Measures the LS cross roll angle as follows:
	a. Sets the gunner's quadrant down squarely on the two bolt heads that line up with the length of the semitrailer.
	b. Centers the bubble in level indicator as in step 8b.
	c. Reads and records cross roll angle to nearest 0.1 mil, as follows:
	(1) Reads as step 8c(1).
	(2) Determines the sign by the direction of the arrow at the base of quadrant.
	(a) If arrow points toward front of semitrailer, the sign is plus (+).
	(b) If arrow points toward the rear of the semitrailer, the sign is minus (-).
d. Assists CM 2 verify cross roll angle data.	d. Notifies CM 1 to verify cross roll angle data.

CREW MEMBER 1	CREW MEMBER 2
	e. Records cross roll angle on Launcher Location/Alignment Data Form. f. Conveys the Launcher Location/Alignment data to the ECS. g. Sets the gunner's quadrant to 0 mils and places it in its case. Stows the gunner's quadrant in the curbside storage box. h. Verifies MCU switch is on (sets Engagement Control Handle back to ROTATE on PAC-3) unless GMC torque tubes are to be unlocked.

APPENDIX F

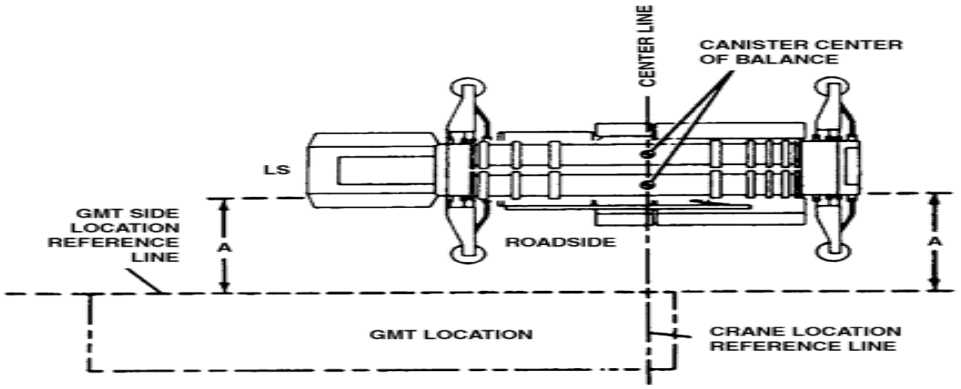
GMT LOCATION MARKERS

Note: The procedure below are perform by CM 1 with assistance from CMs 2 and 3 when performing centralized missile reload.

1. Vehicle Location Markers. GMT position relative to the LS position may be dictated by physical conditions of the area around the LS. Figures F-1 through F-3 show several configurations. Select the step closest to your situation.

All measurements are from edge of LS frame. Do not measure from overhanging platforms. Make measurements at three points—one at each end of LS, and one at center.

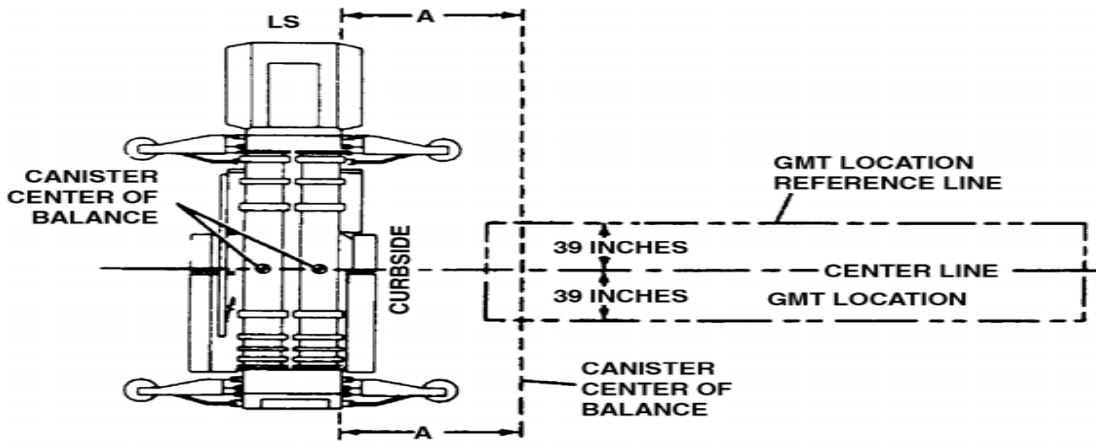
2. Establish GMT Location Markers. The following three figures show GMT location markers.



SITUATION	MEASURE A
GMT level with LS	6 to 9 feet (1.8 to 2.7 meters)
GMT uphill from LS	7 to 9 feet (2.1 to 2.7 meters)
GMT downhill from LS	7 to 9 feet (2.1 to 2.7 meters)

Note: The slope figures are the same for up, down, or cross slope.

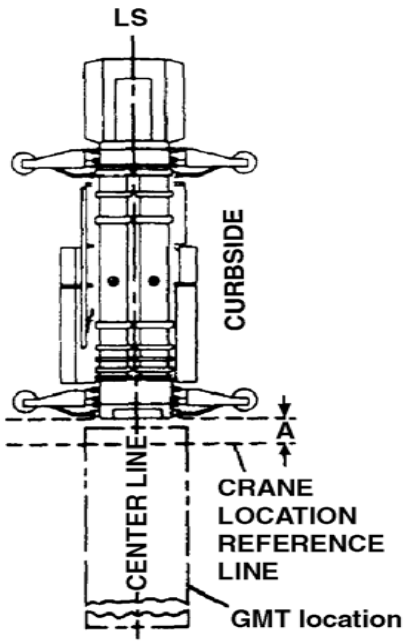
Figure F-1. Vehicle Location Markers (GMT Parallel to LS).



SITUATION	MEASURE A
GMT level with LS	6 to 9 feet (1.8 to 2.7 meters)
GMT uphill from LS	6 to 9 feet (1.8 to 2.7 meters)
GMT downhill from LS	6 to 9 feet (1.8 to 2.7 meters)

Note: The slope figures are the same for up, down, or cross slope.

Figure F-2. Vehicle Location Markers (GMT Perpendicular to LS).



SITUATION	MEASURE A
GMT level with LS	1 to 3 feet (0.3 to 0.9 meters)
GMT uphill from LS	1 to 2 feet (0.3 to 0.6 meters)
GMT downhill from LS	1 to 2 feet (0.3 to 0.6 meters)

Note: The slope figures are the same for up, down, or cross slope.

Two crew members assist driver in positioning the GMT. One crew member at front roadside corner of GMT signals driver. The other crew member observes vehicle position and signals first crew member. Driver takes signals from crew member at front roadside corner of GMT only.

Figure F-3. Vehicle Location Markers (GMT in Line With LS).

APPENDIX G

SERVICE UPON RECEIPT AND DROPPED CANISTER PROCEDURES

1. Service Upon Receipt Procedures. When the GM is received at the site, the unit commander is responsible for making sure that—

    - The GM is properly identified (identification per TM 9-1410-600-14 and markings per TM 9-1425-601-12).
    - The canister records card is brought up-to-date.
    - The GM is in good condition upon receipt.

You must inspect a GM when it is received to ensure it is serviceable and not damaged from shipment, per TM 9-1410-600-14. Canisters must have all required parts and show no signs of rust, peeling paint, or frame weakness. If the inspected GM canister is considered unserviceable, the unit commander must be notified of any damage to the canister structure, missile, and/or conditions, which may interfere with GM storage or launcher.

2. GM Canister. Visually inspect the following items for damage as described (Figure G-1):

    - Forward flythrough or rear blowaway covers are ripped or torn.
    - Cracked, bent, or out-of-place alignment pins.
    - Wood runners are broken off.
    - Punctures and/or holes in canister are greater than 1/8 inch in diameter or length, or appear to be caused by gunfire or shrapnel. Note: Punctures are permissible in forklift channel and bottom plate if they do not extend into canister wall. Cracks in forklift channel metal or weld joints are not cause for rejection.
    - Dents ½ inch or more in depth on any longitude canister edge.
    - Cracks, deformations, or wrinkles 2 inches or more in length or depth in any canister sidewall.
    - Bends or distortions 1/8 inch or more in any missile support shoe frame.
    - Vertical or horizontal bends, distortions, or deformations on the entire canister along the axis of launch.

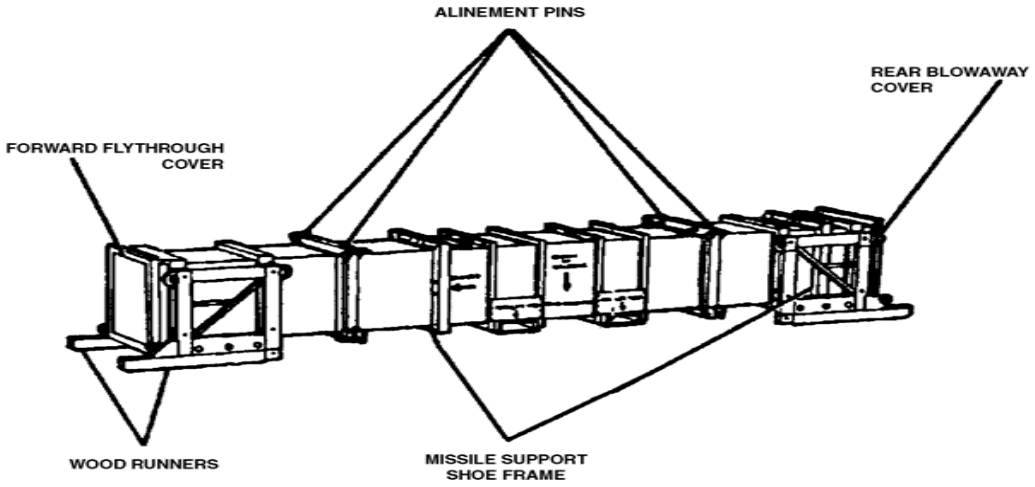


Figure G-1. GM canister.

(Change "ALINEMENT" to "ALIGNMENT" in figure.)

3. GM Canister Instrument Panel. Perform the following inspection checks on the instrument panel:

- Check that the grounding plug is connected to electrical connector J1 (Figure G-2).
- Verify that the canister ground terminal J3 is connected to the transport vehicle's ground terminal by a grounding cable.
- Ensure torque tube handle is pinned to the locked position.

CAUTION

The GM may be damaged if torque tube handle was unlocked while in shipment. In locked position, torque handle is left of center with quick-release pin in right travel restraint hole. When unlocked, torque tube handle is right of center and a red warning patch can be seen on the instrument panel.

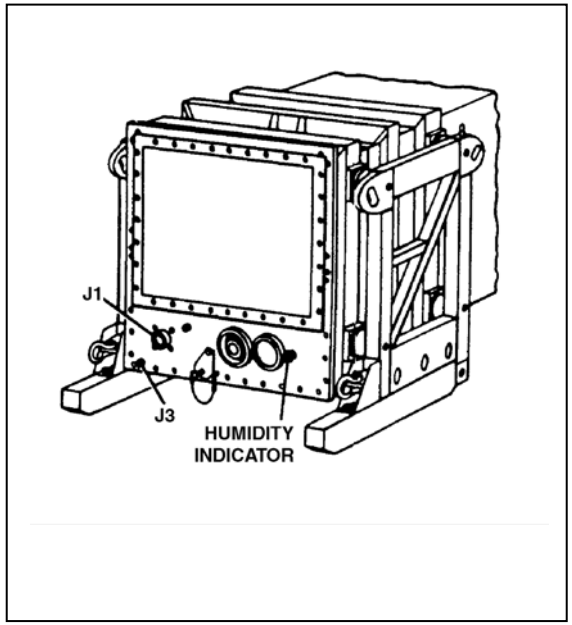


Figure G-2. GM canister instrument panel.

4. GM Canister Humidity Indicator. Ensure that the humidity indicator on the canister instrument panel shows a light to dark blue color in all sectors (20, 40, and 60) (Figure G-3).

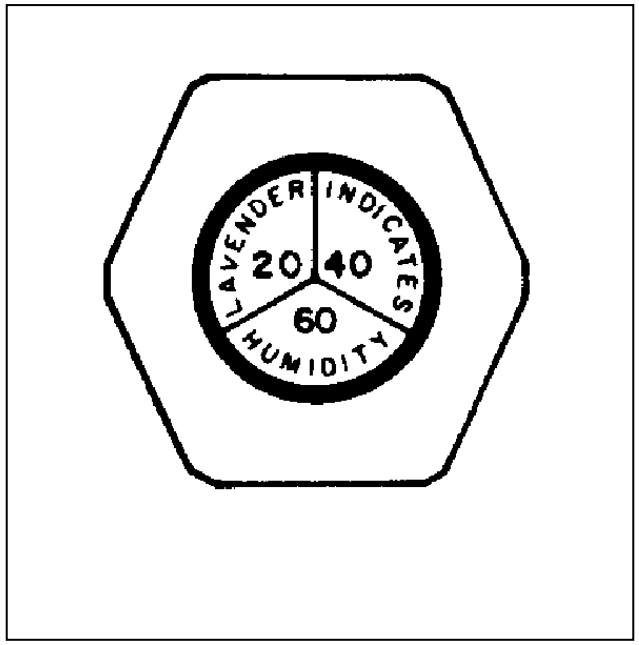


Figure G-3. GM canister humidity indicator.

WARNING

Manual safety and arming checks can cause a GM to fire or explode. No manual safety and arming checks should be performed on the GM.

5. Dropped Canister Procedures. Procedures for a canister that has been dropped 12 inches or more are as follows:

- If the missile remains in the canister, it must be considered **UNARMED**. The crew will log the time for a 1-hour wait and inform the unit commander. The unit commander will acknowledge the crew report, log the time, and, after a 1-hour wait, direct removal and replacement of the GM canister.
- If the missile is partly or completely out of the canister, it will be considered **hazardous**. The crew will log the time for a 1-hour wait, inform the unit commander, leave the area at once, and report when they have evacuated the area. The unit commander will acknowledge the crew report(s), close the launching station area to incoming troops and traffic, and call explosive ordnance disposal for assistance.

APPENDIX H

MRCTS TEST PROCEDURES

MRCTS test procedures are used to ensure that the system is safe before connecting a signal cable to GM. It has a self-test feature and requires power from launcher electronics. Perform the following tests in the sequence shown:

1. Energize power.
2. Energize DLTM.
3. Energize LEM.
4. Check that all five BITE lights are off.
5. Set BITE TEST/OFF/STATUS LAMP TEST switch to STATUS LAMP TEST. Check that all BITE lights are on.
6. Set switch to BITE TEST. BITE lights cycle on and off for 6 seconds. If all BITE lights remain on, test passed.
7. Set switch to OFF.
8. De-energize LEM.
9. Set MRCTS on work platform behind LMRD in position to test GM cables.
10. Press PRESSURE RELIEF valve to relieve pressure in case.
11. Release six latches and remove cover.
12. Release two push-button fasteners on inner lid, swing open, and remove cable.
13. Close and secure inner lid.
14. Set MRCTS POWER switch to OFF.
15. Remove cover from LMRD connector and from MRCTS connector.
16. Connect MRCTS cable to LMRD.

17. Connect MRCTS cable to MRCTS.
18. Open dimmers on each of four MRCTS lights by rotating lens cover fully counterclockwise.
19. Disconnect large GM cable from large dummy connector at applicable position.
20. Connect large GM cable to MRCTS connector.
21. Energize LEM.
22. Set POWER switch to ON.
23. Check to see if POWER ON and SAFE TO TEST lights are on.
24. Press to test NO-GO and GO lights; lights come on when pressed.
25. Momentarily hold RESET switch up. Step display indicates OO.
26. Momentarily hold START switch to START. Step display starts counting.
27. After about 35 seconds, step display indicates 99 and GO light comes on. Test has passed.
28. Set POWER switch to OFF.
29. De-energize LEM.
30. Disconnect GM cable from MRCTS.
31. Connect cable to GM.
32. Repeat steps 19 through 31 to test and connect all cables for all four GMs.

APPENDIX I

CANISTER TIE-DOWN BOLT TORQUE VERIFICATION PROCEDURES

Note: Missile canister tie-down bolt torque verification procedures are performed by CM 2 and must be performed prior to and after launcher operations to ensure that canisters, tie-down bolts, and washers have not loosened or shifted during any launcher movement.

CAUTION

Do not loosen canister tie-down bolts to check torque. Verification of the torque is an inspection to assure the washer is properly seated (flat rather than cocked) and that the bolts have at least 60 foot-pounds of torque. Loosening the bolts to retorque will cause excessive wear on the bolts.

Note: Deep socket goes over nut and fits on driver beneath the nut.

1. Using 1/2-inch drive ratchet head, 30- to 150-foot-pound torque wrench handle, 30-inch extension (PAC-2), 36-inch (PAC-3), and 3/4-inch-deep socket, verify torque value of each canister tie-down bolt as follows:

    a. Set torque wrench handle micrometer to 60 foot-pounds.

    b. Using the torque wrench, tighten each of the four tie-down bolts until torque wrench clicks off.

2. Repeat step 1 until torque values for tie-down bolts are verified on all four missile canisters.

APPENDIX J

BEAM INSPECTION CRITERIA PROCEDURES

Note: Beam inspection criteria is performed by CM3 as part of missile reload procedures to ensure safe equipment and missile-handling operations during missile reload procedures.

1. Inspects beam for evidence of damage that could affect lifting capability. (Bends, punctures, tears, and cracks to the beam are cause for rejection.)

2. Ensures that attaching hardware and shackle pins are present, tight, and properly installed and secure. (Missing hardware is cause for rejection).

3. Inspects welds for breaks, cracks, or corrosion. (Breaks and cracks are cause for rejection. Corrosion should be removed and the beam reinspected.)

4. Inspects hooks for distortion. Note that the throat opening should not exceed 1-1/4-inches (15 percent of normal). (Excess throat opening measurement is cause for rejection.)

5. Repairs beam as within maintenance level and as described in TM 9-4935-600-14 and TM 9-4935-604-24P. Notify supervisor if higher echelon maintenance is required.

APPENDIX K

TEST LAUNCH PROCEDURES

Note: The Test Launch procedures are performed by CMs 1 and 2 before the GMT reload team arrives. This test provide for the testing of functions not tested by ELES built-in test (BIT) and also performs a test-on-test that rechecks functions previously checked by BIT. This test ensures all signals meet the minimum requirements to fire a PAC-2 or PAC-3 missile. It tests all missile inputs (signal and power) at the canister connector end of the umbilical cables.

SETUP FOR TEST LAUNCH

1. Obtain canisters shorting plugs

WARNING

Install shorting plugs immediately after cable connector is disconnected. Otherwise, static charges may explode ordinance devices.

2. Connect all umbilical and heater cables to stowage points.
3. Energize the generator.
4. Ensure A1A3 CANISTER CONNECT/DISCONNECT switches are set to DISCONNECT.
5. Set DIAGNOSTIC UNIT switch to ON.
6. Set LOCAL/REMOTE switch to LOCAL. Verify that the LOCAL light comes on.
7. Set LAUNCH ENABLE/DISABLE to DISABLE.
8. Energize the ELES.
9. After completion of PBIT test, status menu displays ELES GO.
10. Set ELES POWER switch to OFF.

TEST LAUNCH

1. Disconnect umbilical cable(s) from stowage points.
2. Connect cables to—
   - (PAC-2) J-BOX/LSDU J18.
   - (PAC-3) J-BOX/LSDU J13 and J15.
3. Energize the ELES.
4. Set respective CANISTER CONNECT/DISCONNECT to CONNECT. Verify that the DISCONNECT light goes off.
5. Set LAUNCH ENABLE/DISABLE to ENABLE.
6. Select MAIN MENU.
7. On the MAIN menu, select RELOAD.
8. On the RELOAD menu, select the respective canister.
9. On the RELOAD menu, select ACCEPT.
10. On the RELOAD menu, select MENU.
11. On the MAIN menu, select LS SETUP.
12. On the LS SETUP menu, select HTRS.

Note: Selecting each respective heater will turn that heater on. Selecting a heater again will turn that heater off.

13. On the HEATER menu, select the respective canister.
14. The HEATER menu is displayed with respective canister heater shown on. Select MENU.
15. On the LS SETUP menu, select MENU.
16. On the MAIN menu, select DIAG.

17. On the DIAG menu, select TEST LAUNCH.

18. On the TEST LAUNCH menu, select START.

    a. TEST LAUNCH indicates test in progress.

    b. IN PROG indicator is flashing.

    c. MISSILE READY light is on.

19. On the TEST LAUNCH menu, select CONT.

    a. TEST LAUNCH indicates test in progress.

    b. IN PROG indicator is flashing.

    c. TEST PASSED is displayed after test completes cycling.

20. Set LAUNCH ENABLE/DISABLE switch to DISABLE.

21. Set respective CANISTER CONNECT/DISCONNECT switch to DISCONNECT. MISSILE DISCONNECT light comes on.

22. Set ELES POWER switch to OFF.

23. Set DIAGNOSTIC UNIT switch to OFF.

24. Disconnect cables from—

    - (PAC-2) J-BOX/LSDU connector J18.
    - (PAC-3) J-BOX/LSDU connector J13 and J15.

25. Return cables to respective stowage points.

    a. If test launch is to be performed on other canister paths, repeat this procedure for the respective canister path.

    b. If test launch has been performed on other canister paths, perform stray/no voltage test.

APPENDIX LM

NO VOLTAGE/STRAY TESTS PROCEDURES

Note: After the GMs are loaded and secure, CMs 1 and 2 perform the No voltage/stray tests. This test is performed prior to connecting umbilical cables to the munition canister. These tests ensure safety-critical pyrotechnic lines are safe for connection.

NO VOLTAGE TEST PROCEDURES

1. De-energize the ELES.
2. Remove all umbilical cables from canisters.

Note**:** Place shorting plugs on all canister connectors.

3. Connect—
   - (PAC-2) umbilical cable to J-BOX/LSDU connector J17.
   - (PAC-3) power and signal cable to J-BOX/LSDU connectors J14 and J16.
4. Ensure LOCAL/REMOTE switch is set to LOCAL.
5. Ensure LAUNCH ENABLE/DISABLE switch is set to DISABLE.
6. Ensure CANISTER CONNECT/DISCONNECT switches are set to DISCONNECT.
7. Ensure MISSILE DISCONNECT lights are on.
8. Set DIAGNOSTIC UNIT switch to ON.
9. Set ELES POWER switch to ON.

Note: ELES GO is displayed after PBIT test.

10. Select MAIN MENU.
11. On the MAIN menu, select DIAG.

12. On the DIAG menu, select CABLE TEST.

Note: Ensure PMP displays correct canister: PAC-2 or PAC-3.

13. On the CABLE TEST menu, select VOLT TESTS.

14. On the SELECT CABLES menu, select respective canister. VOLT TESTS menu appears.

15. On the VOLT TESTS menu, select CONT.

    a. IN PROG flashes during test.

    b. TEST PASSED is displayed after test passes.

16. Perform stray voltage procedures.

STRAY VOLTAGE TEST PROCEDURES

1. Set ELES POWER switch to TEST. DIAG menu is displayed.

2. On the DIAG menu, select CABLE TESTS.

Note: Ensure PMP displays correct canister: PAC-2 or PAC-3.

3. On the CABLE TESTS menu, select VOLT TESTS.

4. On the SELECT CABLES menu, select respective canister. VOLT TESTS menu appears.

5. On the VOLT TESTS menu, select CONT.

    a. IN PROG flashes during test.

    b. TEST PASSED is displayed after test passes.

6. Set DIAGNOSTIC UNIT switch to OFF.

7. Set ELES POWER switch to OFF.

8. Disconnect—

- (PAC-2) umbilical cable from J-BOX/LSDU connector J17.
- (PAC-3) signal and power cable from J-BOX/LSDU connectors J14 and J16.

9. Remove shorting plugs from canisters and immediately connect tested cables.
10. Place shorting plugs in stowage points.

Note: If test is needed on other cables, repeat this procedure for respective canister.

APPENDIX M

CONVERTING LS TO LOAD MIM 104 OR PAC-3 MUNITIONS PROCEDURES

Note: Any launcher CM can perform this test. This test is performed after the LS is grounded and according to launcher configuration and type.

1. Verify A1 is de-energized per WP 0071, TM 9-1440-1600-10.

2. If converting to launch MIM-104 GM, go to step 3. If converting to launch PAC-3 munitions, go to step 4.

3. Convert LS to launch MIM-104 GM:

   a. Removes protective cap from A1A2J104.

   b. Disconnects 5A5W7P2 from A1A2J108 and connect to A1A2J104.

   c. Installs protective cap on A1A2J108.

   d. Removes protective cap from A1A2J103.

   e. Disconnects 5A5W6P2 from A1A2J108 and connect to A1A2J103.

   f. Installs protective cap on A1A2J107.

   g. Removes protective cap from A1A2J102.

   h. Disconnects 5A5W5P2 from A1A2J106 and connect to A1A2J102.

   i. Installs protective cap on A1A2J106.

   j. Removes protective cap from A1A2J101.

   k. Disconnects 5A5W8P2 from A1A2J105 and connects to A1A2J101.

l. Installs protective cap on A1A2J105.

4. Convert LS to launch PAC-3 munitions:

a. Removes protective cap from A1A2J108.

b. Disconnects 5A5W7P2 from A1A2J104 and connects to A1A2J108.

c. Installs protective cap on A1A2J104.

d. Removes protective cap from A1A2J107.

e. Disconnects 5A5W6P2 from A1A2J103 and connects to A1A2J107.

f. Installs protective cap on A1A2J103.

g. Removes protective cap from A1A2J106.

h. Disconnects 5A5W5P2 from A1A2J102 and connects to A1A2J106.

i. Installs protective cap on A1A2J102.

j. Removes protective cap from A1A2J105.

k. Disconnects 5A5W8P2 from A1A2J101 and connects to A1A2J105.

l. Installs protective cap on A1A2J101.

GLOSSARY

AC, ac
Active Component; assistant commandant; alternating current; aircraft

AEE
automatic emplacement enhancement

ARTEP
Army Training and Evaluation Program

B
before

BITE
built-in test equipment

ccw
counterclockwise

CM
crew member; cruise missile

COMSEC
communications security

CW (cw)
clockwise

D
during; daily; demonstration

DC, dc
District of Columbia; direct current

DLT
data link terminal

DLTM
data link terminal module

DLU
data link upgrade

DP
data processor; decision point

ECS
engagement control station

ELES
enhanced launcher electronic system

FH
frequency hopping

FH/M
frequency hopping/master

FOC
fiber optic cable

FOCA
fiber-optic cable assembly

GM
guided missile

GMC
guided missile canister

GMT
guided missile transporter

GPS
gunner primary sight; Global Positioning System

HEMTT
heavy expanded mobility tactical truck

Hz (HZ)
hertz (cycles per second)

ICOM
integrated COMSEC; imbedded communications

IFF
identification, friend or foe

ITL
intent to launch

kPa
kilopascals

LCD
liquid crystal display

LCU
launcher control unit; lightweight computer unit

LEM
launcher electronics module

LMRD
launcher missile-round distributor

LS
launching station; launching section

MOPP
mission-oriented protective posture

MRCTS
missile round cable test set

MTP
mission training plan; MOS training plan

NBC
nuclear, biological, and chemical

NCO
noncommissioned officer

NFS
north finding system

O/C
observer/controller

PAC
Patriot advanced capabilities; Personnel and Administration Center

PAFU
propulsion arming firing unit

PBIT
power-up built in test

PCP
platoon command post; power control panel

PDU
power distribution unit

PLGR
precision lightweight GPS receiver

PMCS
preventive maintenance checks and services

PSI
pounds per square inch

RF
radio frequency

RSOP
reconnaissance, selection, and occupation of position; readiness standing operating procedure(s)

SBU
slave bus unit

SOA
state of alert

T&EO
training and evaluation outline

TCO
tactical control officer

TM, tm
technical manual; theater missile; team

TOD
time of day

TOE
table of organization and equipment

TQG
tactical quiet generator

TRADOC
Training and Doctrine Command

TWT
traveling wave tube

v
volt

vac

volts alternating current

VDC

volts direct current

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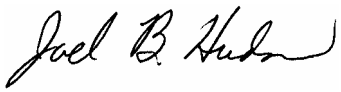
17 OCTOBER 2003

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:



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